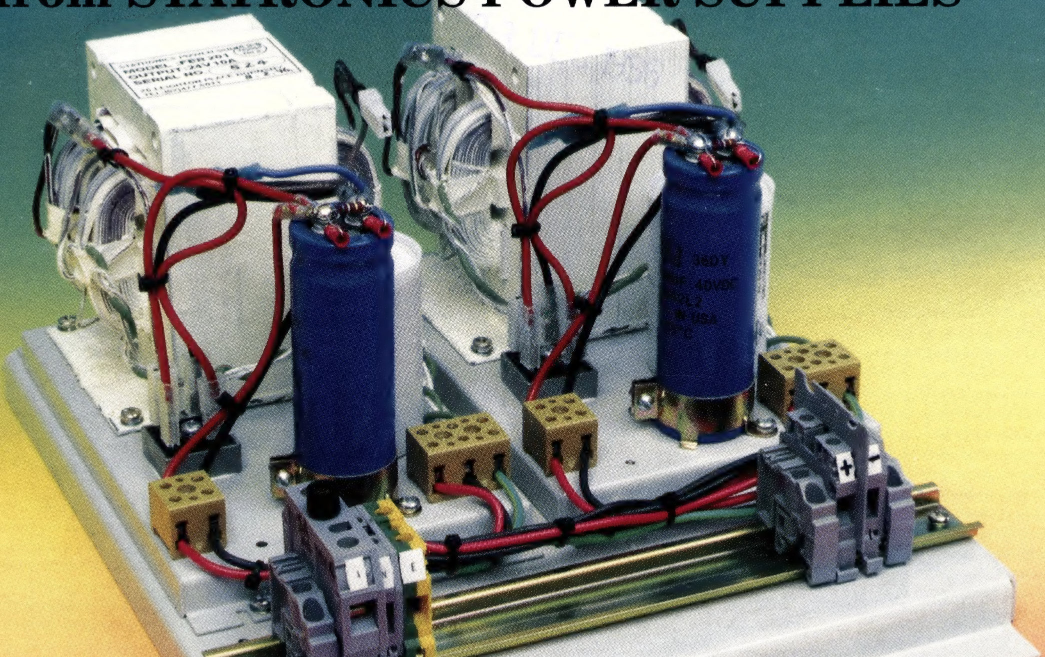
AUSTRALIAN Electronics ENGINEERING

Vol.29 N°12

DECEMBER 1996

Merry Christmas

from STATRONICS POWER SUPPLIES



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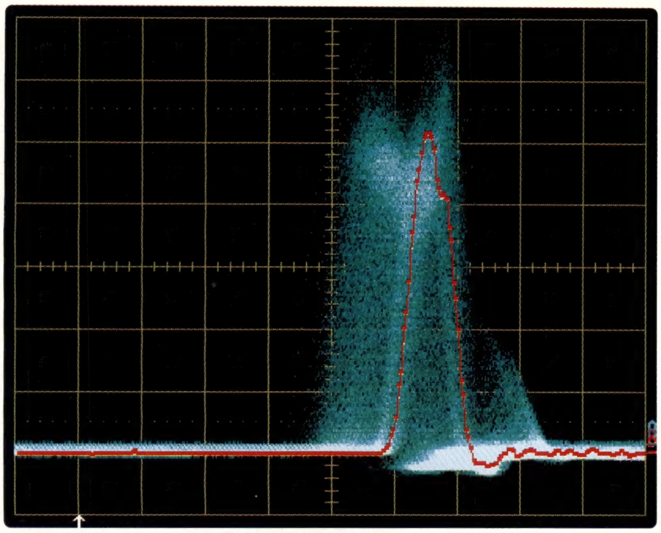
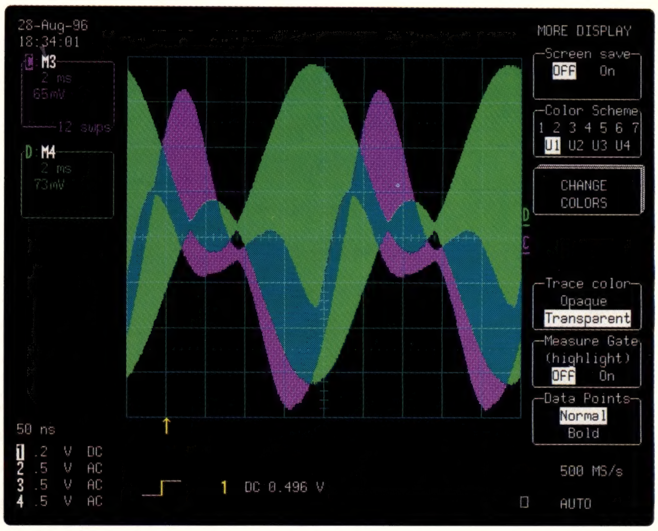
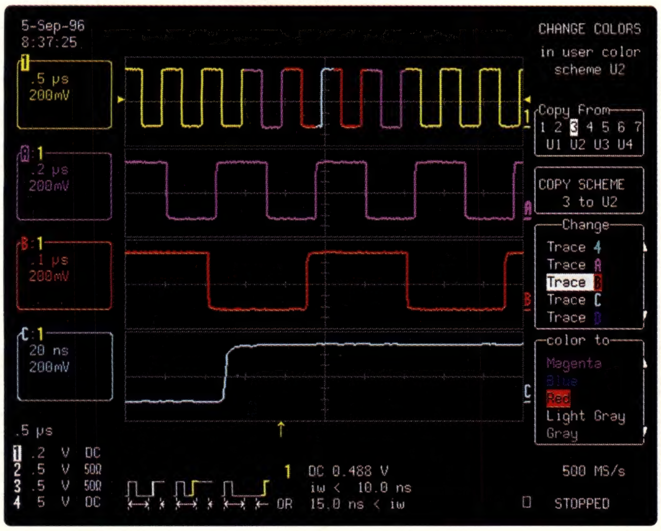
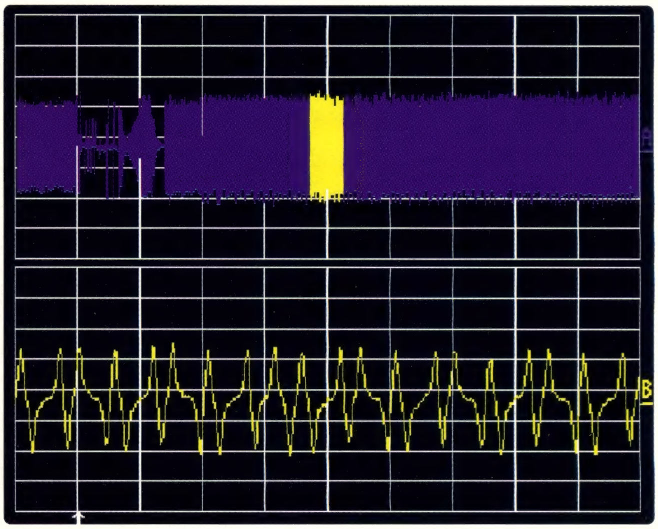
Experience The New Color DSOs From LeCroy









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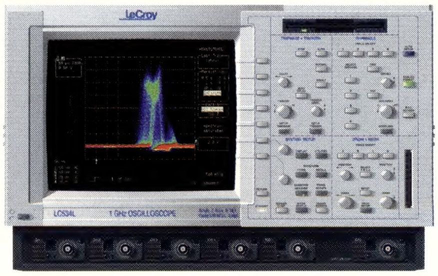

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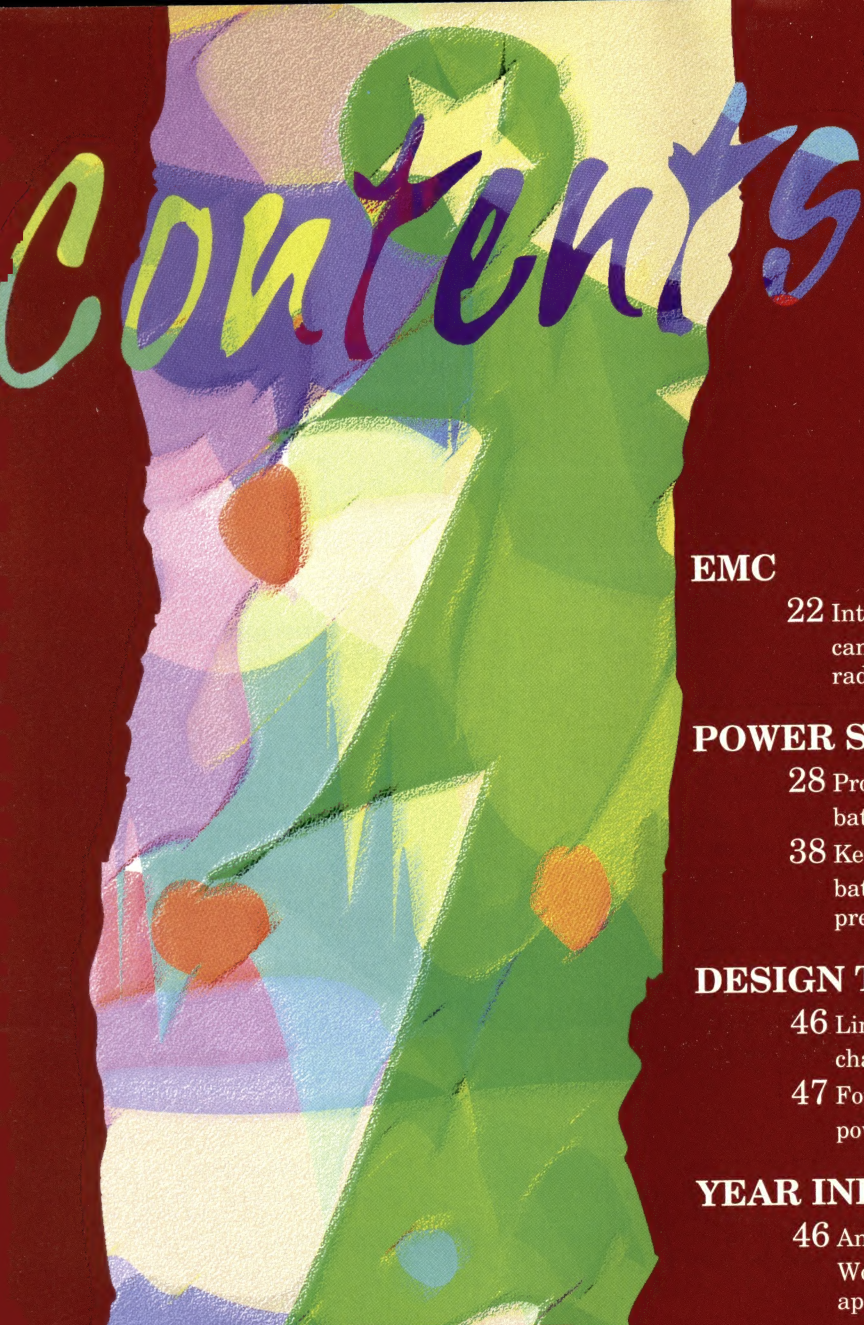

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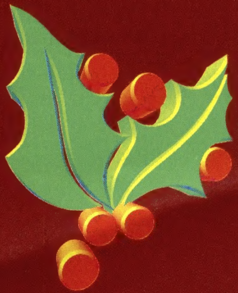
Illustration by Tom Lau



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FROM THE EDITOR'S DESK

Merry Christmas

The ghost of Christmas future

Christmas 1996 is rolling towards us like a large steamroller stuck in first gear. Depending on what sector of the industry you work in you're either frantically busy or slowly winding down and luxuriating in the yuletide lull.

In this issue we present our annual industry review, where we look back at the issues and events that made the news during this last year. We've called it *Vintage 1996 — dry but palatable*, and that about sums up these last 12 months for the industry, I think. Things have been slow in many sectors, but the sharp decline forecast by some in the industry thankfully hasn't eventuated.

There were times throughout the year when it looked like things were beginning to pick up, but industry uncertainty and a flattening out of the global communications market kept the lid on any serious partying, and things remained slow.

The uncertainty was due in part to the ushering in of a new government. After many years on the reserve bench, the Coalition finally got the nod, and the industry seemed to hold its breath, waiting for a sign as to the direction the new team would take.

Frankly, after nine months of waiting, the new government still hasn't given birth to any firm policies regarding the electronics industry. It seems unable to come to terms with the fact that high-tech industries represent a way forward for this country. While moves to reduce our budget deficit are necessary, they should not be made at the expense of an industry with the money generation potential that electronics and telecommunications represents.

Moves to abolish DIFF and the computer bounty, for instance, strike at the foundations of an industry just getting off the ground. Export subsidies have been cut, with no reciprocal moves from our overseas competitors. Rather than levelling the playing field, the government is making it even more of an uphill battle for our technology exporters than ever before.

The electronics industry has borne an unfair proportion of the new government's cost cutting measures, and its time the relevant ministers took note of this and started forming some coherent strategy for long-term industry survival. It will benefit this country far more to have a thriving electronics industry in the future than a few extra dollars today.

Perhaps, as the mystery and magic of Christmas descends on this country, the newly anointed government will reflect on its Scrooge-like behaviour towards the industry, and the Ghost of Christmas future will show them scenes of coming elections, where the decline of Australia's high-tech standing in the world is reflected in the Coalition's popularity at the ballot box. Perhaps they'll wake up in the New Year feeling a little kinder to this industry.

Finally, I'd like to thank you, the readers, for making this year a great year for this magazine. In a recent survey of *AEE* readers conducted by Roy Morgan, you voted us most authoritative industry magazine and best for news coverage. We intend to work hard in 1997 to make *AEE* even bigger and better. Plans include an enhanced and indexed New Products section, new regular features, such the *Out & About* series of interviews with overseas industry leaders premiered in this issue (see page 48), and a slight redesign of the look of the magazine to make it even more readable and easy to use.

I'll keep you posted on these and other exciting developments next year. 1997 is our 30th birthday year, so we plan to make it a big, Big, **BIG** one.

From all the staff at *Australian Electronics Engineering*, have a very happy Christmas, and we'll see you in the New Year. ❐

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AABP

OS distributor invasion continues

The face of electronic components distribution in Australia changed dramatically when two US companies, Arrow and Avnet, recently bought in to the Australian Market. The overseas invasion hasn't stopped, however, with UK-based company Memec acquiring the University Paton Group.

Memec (Memory & Electronic Components) is one of the top 10 electronics distributors in the world and part of the German Raab Karcher organisation, worth US$7 billion. The University Paton Group, which includes ACD, ICD, Elektron, UPL New Zealand and University Instruments, has revenue over A$30 million and is ranked as the 35th largest electronics company in Australia.

UPL managing director Kerry Kelly said, "Memec and UPL have had a close working relationship for many years, which developed due to a similarity in business strategy and operating principle. This means that UPL will continue to provide the focussed support and design-in emphasis that has made it the number one semiconductor distributor in Australia in the face of major US competition."

According to UPL the takeover won't have any major ramifications for the running of the business given the similarities between the two companies. "The philosophy of each independent business unit supporting a manageable number of agency lines gives both our customers and our principals dedicated support compared to the alternative broadline distributor, who must find it difficult to maintain a focus on any particular company it represents," said Kelly.

In another announcement, US company Thomas & Betts, a leading producer of connectors and components, is to make its fifth acquisition of the year, albeit its largest by far, with the purchase of Augat worldwide. It's not quite a done deal. The boards of both companies have agreed but it is still subject to a vote by shareholders on December 11.

UPL's managing director Kerry Kelly — "Memec and UPL have had a close working relationship for many years."

Both companies are active in Australia. Thomas & Betts is based in Melbourne and Augat is in Sydney. An Augat spokesperson said it was still too early to say what changes would happen locally. He said traditionally Thomas & Betts had retained the names of companies it had acquired for brand recognition.

Thomas & Betts currently has sales of around US$1.4 billion internationally and this should increase to about US$2 billion following the acquisition. Thomas & Betts CEO T. Kevin Dunnigan said, "We will be one of the five largest companies in the electronic connector industry. Our products and markets are complementary — not duplicative — and the combination will enable us to offer our customers a broader line of sophisticated electronics products in higher growth markets."

The move of the multinationals began in earnest two years ago. American distributor Arrow took over Victorian companies Veltek and Zatek in October 1994. Then in June 1995, Avnet bought VSI. And in December 1995, Kalamazoo acquired Arlec.

Arlec, Veltek and Zatek have all retained their names but VSI first became Avnet-VSI, then in September this year Avnet Pacific. The final departure of the VSI name came with the departure of a number of former VSI executives including managing director Bob Crabbe.

Crabbe almost predicted his own downfall in an *AEE* interview in November 1994. He said the changes that had occurred up to that point were "nothing compared with what will happen in the next few years. We're about to witness the entrance of the global or semiglobal aspirants. Large, mainly North American, component distributors such as Arrow and Avnet have already begun to move into Asia."

The interest shown by large overseas distributors in the Australian market place is an indication of the growing strategic importance of this country in terms of its proximity to Asian markets and the strong growth in telecommunications. While there are still strong locally-owned distributors such as Adilam on the scene, there is a feeling that the shakeup of the distribution industry is not over yet. ❐

What a GaAs

University of Adelaide researchers expect to have a prototype mobile videophone ready within three years using a new 'superchip' made from gallium arsenide technology.

The university's Centre for Gallium Arsenide VLSI Technology has entered a technology sharing agreement with Motorola. Gallium arsenide is ten times faster than silicon, has less power consumption, greater tolerance to radiation and better optical properties.

Motorola has now developed complementary gallium arsenide which can integrate optical, digital and radio frequency functions on the one chip. It can be used to create a compact mobile phone with extended multimedia features such as video communication, interactive banking and global positioning for personal navigation.

"This agreement is a great example of the sort of collaboration with industry we're encouraging right across the industry," said Professor Mary O'Kane, the university's acting vice-chancellor. ❐

BT and MCI sing in Concert

British Telecommunications (BT) and MCI, the second largest US telecommunications company have merged to form Concert. The new company claims to be the second largest carrier of international phone traffic in the world, the leading provider of global communications services and the world's most profitable communications company.

The new company will have 183,000 employees and an annual revenue of US$42 billion. It has ventures in 15 countries, including Clear Communications in New Zealand, and it will possibly get involved in Australia following deregulation next year.

BT bought 20% of MCI in 1993 and created Concert Communications Services as a joint venture between the two companies. Under this latest agreement, each MCI share will be converted into 0.54 of a Concert American depositary share (ADS), equivalent to 0.54 of a BT ADS plus $6 in cash. The merger agreement has been approved by the boards of both companies.

The new company will provide an integrated set of local, long distance and international services including voice, data, wireless, Internet and intranet, information technologies and outsourcing. MCI and BT will continue to trade under their own names in the US and UK respectively.

The new board of directors will be chaired jointly by BT's Sir Iain Vallance and MCI's Bert Roberts. Vallance said, "Concert will be exceptionally well placed to play a leading role in the major growth areas of the changing global communications market. The complementary strengths and skills of BT and MCI will enable Concert to take full advantage of the tremendous opportunities provided by the forthcoming liberalisation of telecommunications markets in the US and Europe."

Roberts was more brash in his assessment of the new company. "Financial muscle, global customers and brands, and customer driven innovation will trump the competition as we open up communications markets both domestically and around the world," he said. ❐

Siemens has announced that its Australian and New Zealand operations have recorded combined sales of $730 million, their best year ever. This resulted in a net profit of $43.2 million. Managing director Helmut Pekarek said, "One of the highlights of the year was establishing the world's longest synchronous digital hierarchy (SDH) telecommunication link, over 5000km from Brisbane to Perth, as part of our strategic partnership as sole supplier to Telstra of optical transmission gear." ❐

Standards Australia has released AS/NZS 1852 International electro technical vocabulary. It is a glossary of terms for electrotechnology issued as separate Parts, each dealing with a specific field. SA is also seeking comment on draft standard DR 96490 Siting of radiocommunication facilities Part 2 Guidelines for fixed, mobile and broadcasting services operating at frequencies above 30MHz. Comment closes December 31. ❐

Philips Electronics is to play a key role in the development of SCATS 2, an enhanced intelligent traffic management systems. The original SCATS (Sydney Co-ordinated Adaptive Traffic System) was developed by the NSW Roads and Traffic Authority in 1974. It is now used in 40 cities in Australia, the US, Malaysia, Hong Kong, Ireland, China, New Zealand and Singapore. ❐

The International Telecommunications Union's World Telecommunication Policy Forum has reached consensus on key issues surrounding GMPCS (global mobile personal communication by satellite) This will involve seamless global mobile fax, messaging data and even two-way voice and broadband multimedia connectivity via small handheld phonesets, computer-mounted terminals and laptops. ❐

NEC Australia and Aspect Computing have been chosen by the Victorian government to provide infrastructure and services for an electronic service delivery (ESD) network comprising kiosk terminals, Internet home PC and interactive voice response (IVR) systems. The system will be used for paying government bills such as water or electricity or updating information such as electoral rolls. The system should be up and running by August 1997. ❐

EMC Technologies has gained registration with the Voluntary Control Council for Interference (VCCI) of Japan. VCCI approval is virtually mandatory for all ITE products sold in Japan. The registration means Australian manufacturers selling into japan can now get their products tested locally. ❐

The Australian Electronics Development Centre (AEDC) has announced the education program for the 1997 Electronics at Work exhibition to be held in Melbourne on June 18 and 19. The topics include: design for manufacturability; reliability of electronic systems; latest trends in components, processes and PCBs; advanced EMC design; EMC case studies; EMC for installations and cabling; telecommunications environment post 1997; software quality & CMM, SPICE, ISO9000; and multimedia & on-line services. ❐

In France, Innovatron Industries and SGS-Thomson Microelectronics have signed an agreement to cooperate in the definition, design and development of high security smartcard products with interfaces that allow contactless transactions. Contactless cards communicate with a remote reader via radio signals so they can permit faster customer throughput and lower wear. However, they don't currently have the security required for many applications. ❐

Pacific Solar says it is on target to produce a solar cell that will make solar power competitive with other forms of electricity generation. The company hopes to produce the first modules of the cell using pilot line equipmenmt by the end of 1997 and expects the line to be fully operational by the end of the following year. ❐

The Illawarra region of NSW is planning to become the centre of the telecommunications industry in Australia. The Illawarra Telecommunications Advisory Service has been set up to assist firms looking to move or expand their operations. The incentive is proximity to Wollongong University's Institute for Telecommunications Research. The institute contains the only centre for network design and evaluation in the southern hemisphere. ❐

Record crowd for Elenex

According to exhibitors, Elenex 96 held in Melbourne generated "solid leads".

Australian Exhibition Services, the organiser of Elenex 96, has announced that a record 12,474 visitors attended the exhibition held in Melbourne from October 8 to 11 this year.

Elenex, the 8th Australian International Electrical and Electronics Industries Exhibition, attracted 142 exhibitors. One of them, Hugh Kelly of Australian Electronic Manufacturing Services (AEMS), which recently opened a new plant in Melbourne, said "The positive thing was that the people attending seemed to be more solid as leads and we are meeting some excellent contacts as a result of being here."

Ralph Chow, marketing manager of the Hong Kong Trade Development Council, said, "This has been the first time that any of these exhibitors have been involved in exhibiting at an Australian show and this show is suitable for them. We seem to see the right sort of people."

More than a third of the visitors were managers, directors or owners of business and a further fifth were engineers. The principal business activity was manufacturing (18% in general manufacturing, 14% in electronic equipment and 7% in electrical equipment. Most of the visitors were from Victoria but all states were represented along with 24 countries in Asia, Europe and North America.

Next year's exhibition will be held in Sydney from August 26 to 29. ❐

Just a little wafer

France Telecom-CNET and SGS Thomson Microelectronics have successfully processed the first wafers in the next generation of submicron semiconductor technology, using a 0.25 micron drawn CMOS process.

The wafer was developed at SGS Thomson's fabrication plant in Crolles, near Grenoble, in France. The CMOS process will be used to manufacture 'superintegrated' ICs for high speed applications such as computers, low power applications, such as digital mobile phones, and for advanced consumer digital entertainment systems. The first prototypes will start production in the second quarter of 1997.

The process uses deep ultra-violet light and lithography and chemical-mechanical polishing to achieve the 0.25 micron size. Features include an advanced transistor architecture incorporating shallow trench isolation, an effective gate length of 0.20 micron, up to six layers of metal interconnect and 5nm gate thickness. This allows more than 30,000 gates per square millimetre of silicon, more than double that of the 0.35 micron process.

"This achievement is part of our technology road map. We achieved the same milestone with the previous generation technology at 0.35 micron just 16 months ago," said SGS Thomson's Joel Monnier. "The development of the next generation process is going on. We have already demonstrated fully functional transistors at 0.18 micron and the development of the complete process is continuing." ❐

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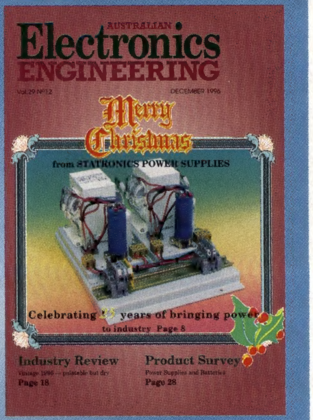
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It is 1971. The first **Statronics** power supplies roll out of the company's humble premises at Excelsior Street Granville to be used by AC&E to power training aids for the education department.

In the mid 70's, a small family of laboratory power supplies included the quietest 0-50V lab supply available, and two models that went to every ABC colour engineering department — an order repeated two years later.

After restructuring in 1982, the Ferro-resonant range was added to the 53-series linears, both now industry standards.

In 1986, Statronics licensed its highly advanced switch-mode technology to Qualidyne Systems, part of the Unitech group, whose president, Ron Carpenter, nicknamed the supplies "Koala". Watch out soon for "Koalas in space"!

ISO9001 accreditation was obtained in August 1994, and in 1995 Statronics won a 5-year contract with Thomson Marconi Radar to design, manufacture and supply high efficiency dc-dc converters for the Bara Sonobuoy project.

Statronics' latest development is unique 300W and 400W sources for LV halogen lamps, featuring 0.99 power factor, Class B noise, EC compliance, dual or auto input voltage selection, soft start, 3% regulation, 200g weight and over 90% efficiency. ❐

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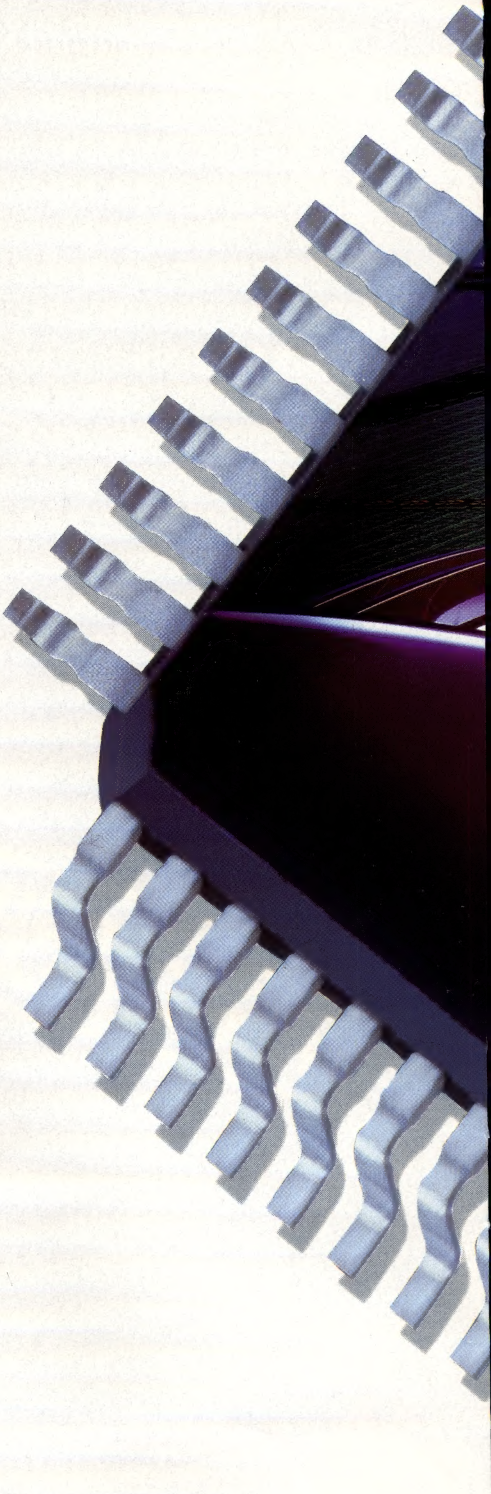

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Little things make a big difference

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Soanar (an Arlec Australia company) has announced a distribution partnership with US-based **Actel**. Under the deal, Soanar will distribute Actel's range of FPGA products and offer engineering support to customers. Actel is a leading manufacturer of antifuse-based FPGAs and associated software development tools. ❐

US-based FPGA manufacturer Actel signs Arlec as its Australian distributor.

Independent Distribution Network (IDN) has been appointed the Australian agent for **FW Bell Inc**, a US manufacturer of measurement and test instrumentation based on Hall-effect technology. Products include Gaussmeters, current and power meters, current sensors and Hall-effect generators and devices. ❐

Robotic Automation has announced that it has been appointed Australasian agent for **Leuze Electronics'** range of optoelectronic sensors. The range covers safety and sensor devices commonly used in automated facilities. Core products include safety light curtains, bar code systems, optoelectronic sensors and laser products. ❐

Veltek has recently been busy establishing itself on the Net. Its new Web site can be found at *http://www.veltek.com.au* and contains data, new product and application information from the company's stable of semiconductor and passive components. The company has also announced the establishment of an ASIC products page on the **Qualcomm Incorporated** website at *http://www.qualcomm.com/prodtech/asic/*. ❐

Scientific Devices will distribute in Australia **Keytek's** range of test products. The range includes the CE*MASTER* multistandard compliance-level CE immunity tester which can perform EMC compliance testing for ESD, EFT, surge, power frequency magnetic field, pulse magnetic field, dips and interrupts. ❐

Melbourne-based *Alfa-Tek* has announced it will be distributing products from US communications company **Intellon**. Intellon has a patented communication process called spread spectrum carrier (SSC) technology which enables the creation of Ethernet-like networks using 'noisy' communications media such as RF and ac power wiring. Intellon's products are aimed at the home automation and embedded systems markets. ❐

Alcatel flushed prior to cable laying

Alcatel has been awarded a $500 million contract to supply a new transatlantic optical fibre telecommunication system linking London and New York. And a substantial portion of the submarine cable will be manufactured at Alcatel's Port Botany facility in Sydney.

The system will consist of two submarine cables with a total length of 12,000km and around 180 repeaters. It will use synchronous digital hierarchy (SDS) equipment and will feature a fully redundant configuration with a capacity of 10Gbit/s.

The new ring will carry broadband services such as multimedia and Internet as well as more traditional voice and data communications. It is scheduled for completion in early 1998. The contract was awarded by Cable Co International, a joint venture of MFS Communications and Cable and Wireless.

The transatlantic cable run is over four times the length of the JASURAUS cable link which Alcatel is currently laying between Western Australia and Jakarta. JASURAUS is a joint venture with Telstra and Optus that will link Australia to the Asia Pacific Cable Network❐

Visio sees a bright future

Angus Robertson of Visio, a new player in the Australian software market.

US-based software company Visio has reported a successful first six months in Australia. Business development manager Angus Robertson said, "We have established two distributor partners in Australia, Tech Pacific Australia and Q*Soft Australia, established a wide dealer and retail channel, and set up a direct customer hotline and fulfilment service."

Visio specialises in software for technical drawing and business diagrams. The recently announced Visio Technical 4.1 allows technical professionals to create and share 2-D drawings and schematics using predrawn symbols. "Users are moving away from more complex and difficult-to-learn drawing and diagramming packages towards our easy to use 'drag and drop' approach," said Robertson. ❐

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The new MVME2600 and MVME3600 VME processor boards from Motorola provide further compelling evidence. Designed to deliver all the massive processing capability of the PowerPC microprocessor in compute intensive and data hungry applications, Motorola's PowerPlus VME architecture maximises both processor performance and I/O throughput. A complete human interface that incorporates VGA graphics, four serial interfaces, parallel port, plus a PCI expansion interface which allows the addition of an optional I/O carrier which holds two extra PMC modules or four IndustryPacks.

You'll find software developers are looking to the future as well. All the major real-time kernel vendors are committed to support this new PowerPlus VME architecture with board support packages.

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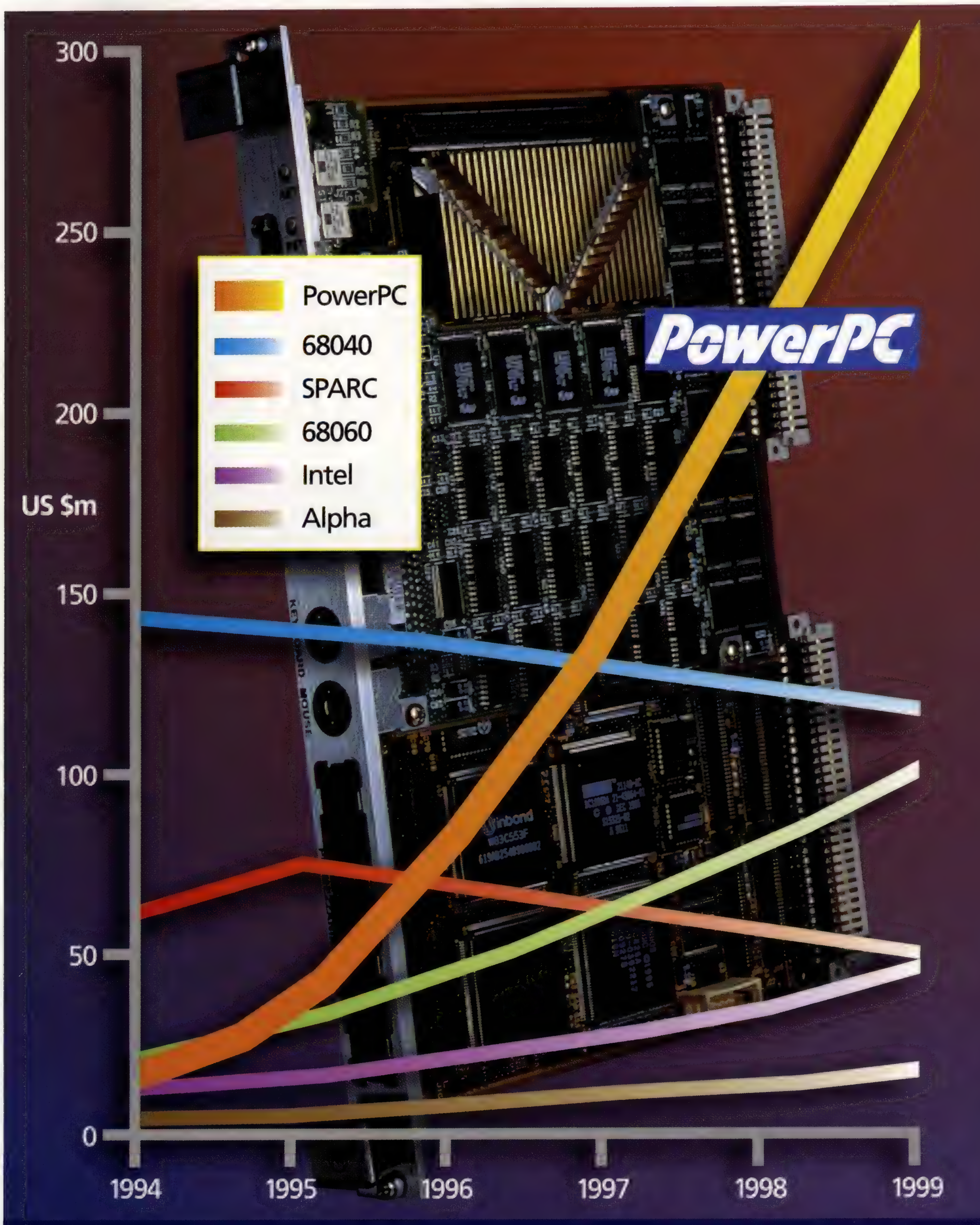

Charted projections of worldwide VMEbus CPU Shipments by Microprocessor type in US$ Millions

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PHOTOSYNTHESIS

Don't say it in broken English

An Australian company, Applied Voice Technologies, has released what it claims to be the world's first commercial large vocabulary continuous speech recognition system. RADTalk is aimed at the radiology market but the company will be applying the technology to other markets in the near future,

AVT general manager Jason Beever said the adoption of voice recognition had been slow to date because the technology had not been able to meet the demands of the real world. Products with vocabularies large enough to handle dictation used discrete speech which requires large pauses between words.

RADTalk uses a continuous speech recognition engine developed by Philips and regular dictation recording equipment. The software includes templates and macros so a final report can be formatted directly from the recorded dictation. A development system of RADTalk has already been installed in Sydney's New Children's Hospital.

Speaking at the launch, Bernard Malone, Australian business unit manager for Philips Speech Processing, said he was pleased that the world's first commercially available product using the Philips engine had come out of Australia rather than Holland or anywhere else. He said Philips would be releasing its Digital Pocket Memo next year.

Beever said the next applications to be released would also be medical, aimed at the pathology, cardiology and psychiatry markets. But he predicts a much broader future for speech recognition. "Today's industry standard is the GUI, or graphical user interface. Tomorrow's standard will be the VUI, or the voice user interface," he said.

AVT, a subsidiary of Southern Group, has also signed a second and exclusive agreement with Philips to establish and operate the Philips Speech Processing Solution Centre in North Sydney. The centre will provide training and certification to other Australian based software developers wishing to use voice recognition technology, as well as providing support services for Philips and its customers. ❐

Job vacancy — must be mobile

AMTA's president Steve Haritos.

The Australian Mobile Telecommunications Association (AMTA) is to set up its own secretariat and appoint an executive director.

AMTA president Steve Haritos said increased resources were needed to deal with the exponential growth in issues concerning the mobile communications industry such as environmental/health matters, the analogue phaseout, changes in spectrum policy and the new telecommunications regulatory environment. The decision follows a review of members which concluded that members were generally happy with the performance of AMTA but believe it needs a higher profile. AMTA is advertising for the position and hopes to make an appointment before the end of the year. The position will be located in Canberra within the Australian Electrical and Electronic Manufacturers' Association (AEEMA).

"This decision is a positive step for AMTA and is a further step in its development as the representative body for the mobile communications industry, an industry worth in excess of $4 billion," said Haritos. ❐

ON THE MOVE

Motorola Semiconductor recently named **CD Tam** as general manager of its worldwide microcontroller technologies group. Tam's previous role as head of the Asia Pacific Semiconductor Group will be filled by **Carlos Genardini**, who previously co-managed the group with Tam. ❐

Carlos Genardini — New head of Motorola's Asia Pacific Semiconductor Group.

Tony Jansz, general manager of Intel Australia since 1994, has been promoted. He will take on the role of South Asia regional sales manager based in Singapore. Jansz will oversee all distribution business, Intel's networking communications products and related activities in Australia, India, Indonesia, Malaysia, New Zealand, Philippines, Singapore, Thailand and Vietnam. As yet Intel has made no announcement regarding his replacement. ❐

Joe Oliva has been appointed Wandel & Goltermann's general manager for Australia. The company's managing director Stan Condy said the creation of the new position was the result of the expansion of the company's communication test and measurement sales in Asian markets. Condy has been heavily involved in setting up operations in a number of Asian countries, creating the need for a dedicated Australian head. ❐

Joe Oliva.

Neil Creasey has been appointed branch manager of the newly opened Sydac Software office in Melbourne. He will be responsible for connecting manufacturing and R&D businesses with the resources of the Sydac Group in Adelaide. ❐

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Australasian Cable & Satellite TV Exhibition & Conference, February 4–6, 1997, Sydney Convention & Exhibition Centre, Darling Harbour. Contact: tel (02) 9210 5700, fax (02) 9223 8216. ❐

Evaluating the role of ATM in Network Infrastructure, February 19&20, 1997, Wentworth Hotel, Sydney. Contact: IIR Conferences, tel (02) 9954 5844, fax (02) 9959 4684, e-mail iir@ozemail.com.au. ❐

Catching the Tide: Engineering Opportunities on the Indian Ocean Rim, May 1-2, 1997, Sheraton Hotel, Perth. Contact: Helena Spedding, Institution of Engineers, WA (09) 321 3340.❐

KES 97 International Conference on Knowledge-Based and Intelligent Engineering Systems, May 21–23, 1997, Adelaide Convention Centre. Contact: Conference General Chair, tel (08) 8348 4265, fax (08) 8348 4261, e-mail cpay@regency.tafe.sa.edu.au.❐

Electronics At Work Exhibition & Seminars, June 18&19, 1997, World Trade Centre, Melbourne. Contact: Practical Marketing, tel (02) 9958 1811, fax (02) 9958 2579, e-mail information@practicalmarketing.com.au. ❐

SMPTE '97, July 1–4, 1997, Darling Harbour, Sydney. Contact: Expertise Events, P.O. Box 547, Manly NSW 2095, tel (02)9977 0888, fax (02) 9977 0336, email exhibitions@exevents.com.au.❐

Cards Australia 97, August 26–28, 1997, Melbourne World Congress Centre. Contact: AIC Exhibitions, tel (02) 9210 5700, fax (02) 9223 8216. ❐

OVERSEA

The 1997 Pan Pacific Microelectronics Symposium January 29–31, Sheraton Maui Resort, Hawaii. Contact: Yanic Freedman tel +1 415 964 5111. ❐

Inter Comm 97 Global Communications Congress, February 24–27, 1997, Vancouver, Canada. Contact: Inter Comm 97, tel +604 669 1090, fax +604 682 5703. ❐

IPC Printed Circuits Expo '97 March 9 — 13, 1997 San Jose Convention Centre, California, USA. Contact: Dave Bergman, IPC 2215 Sanders Rd Northbrook IL 60062 USA tel 0011 1 (847) 509 9700 fax 0015 1 (847) 509 9798.❐

Convergence Tech & IC Expo April 22 — 24, 1997 Dallas, Texas, USA. Contact: Electronic Conventions Management, 8110 Airport Bld, Los Angeles CA 90045 USA, fax 0011 1 (310) 641 5117. ❐

The 47th Electronic Components & Technology Conference May 18 — 21, 1997, San Jose, CA, USA. Contact: Jim Bruorton, tel 0011 1 (864) 963 6621. ❐

The DSP World Spring Design Conference May, 1997, Washington DC, USA. Contact: Denise Chan, Miller Freeman Inc., tel +1 415 278 5231.❐

Asia Telecom '97 June 9–14, World Trade Centre, Singapore. Contact: Tom Dahl-Hansen tel +41 22 730 5298, fax +41 22 730 6444. ❐

Surface Mount International, September 7–11, 1997, San Jose Convention Centre, USA. Contact: Larry Westfall, Miller Freeman Inc, tel +1415 278 5242, fax +1415 905 2220, Web http://www.cassembly.com/smi.html.❐

Telecom Interactive 97, September 8–14, 1997, Palexpo, Geneva, Switzerland. Contact: Tom Dahl-Hansen, tel +41 22 730 5298, fax +44 22 730 6444.❐

electronicAsia October 14 — 17 1997 Hong Kong Convention & Exhibition Centre. Contact:Messe Munchen tel 0011 49 (89) 5107 219 fax 0015 49 (89) 5107 138. ❐

The state of ATE

Japanese manufacturer Advantest leads the world in automatic test equipment (ATE), according to a recent report from US market research company VLSI Research. With annual sales of nearly US$1 billion Advantest holds nearly 20% of the market.

Not too far behind is the leading US company Teradyne with sales of US$750 million. Also in the top ten are Schlumberger, Ando Electric, Tokyo Electron, Hewlett-Packard, LTX Corporation, Yokogawa Electric, Credence Systems and Hitachi. This works out at a very neat five Japanese and five American companies in the top ten. Together they make up 78% of the ATE market. ❐

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Vintage 1996 — dry but palatable

1996 electronics industry review

It wasn't a great year for the electronics industry. With the economy tight, a number of players were feeling the pinch. But there are some signs that 1997 will be bigger and better.

– by Christopher Connolly

What can we say about 1996? It was a leap year, which is sort of appropriate since a couple of companies, Exicom and Stanilite, leapt lemming-like over the cliffs of financial ruin. It was also the year the Coalition swept into power after thirteen years in the political broom cupboard. And the first thing they did was buy a new broom and clean out those Labor cobwebs: DIFF, TCS and the computer bounty.

All up, it wasn't a great year for the industry. The economy bumped along, hinting that it might pick up but never carrying it through. Alex Gosman, executive director of the Australian Electrical and Electronics Manufacturers' Association (AEEMA) described it as a challenging year. "There's a great deal of uncertainty in the industry. The economy's been recessed since September 1995 and there's not a lot of consumer confidence. Orders come in in a much shorter time period and in lower volumes. The Australian dollar is higher which isn't good for exports and we've got a new government after thirteen years in opposition," he said.

He also said there were good prospects, particularly in the telecommunications area, but the industry in general was waiting for some sort of strong signal. This is backed up by a couple of recent surveys. The Australian Chamber of Manufactures found the Australian manufacturing industry as a whole was still in a slump although there was increasing confidence. And an American report on the world semiconductor market predicted a decline in all markets for this year followed by a recovery in 1997. It puts the decline down to an oversupply/plummeting price situation.

Adilam Electronics was one of the companies hit hard by the crash of Exicom, but managing director Keith Anderson said the company had recovered well, a fact evident from its big presence at the inaugural Electronics At Work exhibition in June this year.

It wasn't all bad news. Telecommunications remained strong, led by, among others, Alcatel Australia and Radio Frequency Systems, the winners of the AEEMA Exporter of the Year awards in telecommunications. Exports in the area are now worth over $1 billion, accounting for more than 40% of exports in the information industry. Gosman said the broadband rollout and Australia's proximity to the booming Asia Pacific region augured well for the industry.

What's the DIFF?

The AEEMA Exporter of the Year awards are meant to be an evening of backslapping, celebrating the success stories in the industry. This year's awards were a bit like a medieval punishment with Deputy Prime Minister Tim Fischer in the stocks, copping tomatoes and rotten cabbages from a number of directions.

The reason for this volley of vegetables was the new government's budget cuts which have been felt particularly heavily by the electronics industry. The major concerns are over reduction of research and development funding and plans to abolish the tariff concession scheme (TCS), the development import finance facility (DIFF) and the computer bounty.

AEEMA's Alex Gosman described the abolition of TCS as a very bad decision. "It's increased the cost on a range of products and it hasn't affected imports." He said the electrical and electronics industries were the hardest hit sectors of manufacturing industry given their reliance on key imported components not manufactured in Australia. AEEMA predicted cost increases of 2-3% and an overall cost disability of 8% to the industry when the reduction in tariffs was also taken into account.

The abolition of DIFF, an aid scheme to help industry in developing countries, attacked the other end of the business. Gosman said no one would benefit from the decision. It assisted developing countries make the transition from being dependent on grant aid to a more commercial outlook. And it would potentially reduce Australian exports of electronic products by up to 10%. However, he was hopeful that a new form of the DIFF scheme would be reintroduced in the near future.

The third prong in the government's trident attack on the industry is the abolition of the computer bounty. It applies to various computer and telecommunications related products and is paid as a percentage of value-added. The Australian Telecommunications Industry Association (ATIA) said the scheme has played a vital role in stimulating development of the Australian electronics industry. But the federal government wants to abolish it from the end of June 1997. ATIA predicts it will have a devastating effect on small companies already facing extra costs from the changes to TCS and could result in the loss of 1600 jobs in the industry. ATIA is currently lobbying the government to retain the computer bounty.

The Lemmings

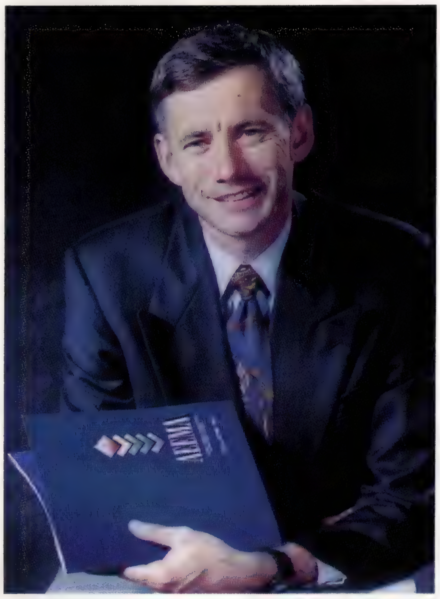
A year's a long time in politics, football and the electronics industry. In last year's industry review we wrote, "One of the star export companies this year has been Stanilite." Two months later we were reporting a first half loss of $11.7 million but "the company hopes to return to profitable operation during the second half". By July all the directors had resigned and receivers were appointed.

In a way Stanilite's success led to its downfall. In 1995 the company won a $37.5 million contract to supply cellular phones to Russia. When the Russians couldn't meet their payments, Stanilite ran into similar problems with its own creditors. This was compounded when another big overseas contract to the Argentinian phone company CTI ran into trouble. CTI alleged default on the contract and demanded penalty payments. The death knell had sounded.

According to a report in *The Australian* Stanilite executive chairman Brian Gatfield said the company's demise was a result of "inadequate management which ignored warning signs". Other industry people suggested a company that grew as fast as Stanilite was always going to be susceptible to the type of trouble it ran into.

Prior to Stanilite's downfall we saw the crash of Exicom. Although the company had been struggling for a few years, few people expected it to go belly up and the shockwaves were felt throughout the industry. The company already had problems with high overheads and mounting debts when Telstra refused to pay Exicom following a dispute over faulty product. The company didn't have the resources to ride it out.

There was hope at one stage that WA company ERG and Simmonds from Canada would come to the rescue and inject $70 million into Exicom but it was not to be. ERG had a number of conditions for the recapitalisation, principally that there be "no material change in the business, profitability or prospects of Exicom". Although Exicom worked hard towards fulfilling the conditions it produced a downgraded forecast of revenues for the next financial year and failed to resolve a rent problem with its landlords. ERG and Simmonds withdrew their offer.



AEEMA's chief executive Alex Gosman voiced concerns over the burden placed on the industry by recent government cuts.

Exicom was placed in the hands of administrators a couple of days later and bitter executives blamed ERG for the demise, but as another industry source said, "Maybe ERG gave Exicom more hope than they should have, but Exicom should still have had a contingency plan in case the funding didn't happen — and it didn't."

Adilam Electronics was one of Exicom's major customers and hit heavily by the company's collapse but it has recovered well. "We made a profit for the year," said managing director Keith Anderson. "We're a sufficient size now to cope with a loss like that. We managed to pick up other business. There was a bit of a lull after the collapse until people like Com10 picked up some of the pieces of Exicom. We've put it behind us now."

Movers and shakers

It was a good year for manufacturing in Melbourne. In September Sydney-based printed circuit board assembler Australian Electronic Manufacturing Services (AEMS) opened a new manufacturing facility in the southern city. While earlier in the year, Hewlett-Packard opened a $10 million facility for R&D and manufacture of advanced telecommunications products. Other large manufacturing facilities were opened in Melbourne by Precision Circuits and Datacraft.

There were a couple of new players joining the local components supply market this year. The Singapore-based BBS Group launched BBS Electronics Australia while University Paton Ltd (UPL) gave birth to Elektron, aimed at the passive and electromechanical sector of the market. UPL itself was subsequently bought in that latter part of the year by the German electronics distribution giant Memec, who follows in the footsteps of Arrow and Avnet, two huge US concerns which have recently acquired their way into the Australian market.

Another birth in the industry this year was that of Electronics At Work, a new exhibition specifically targeting the electronics industry and held in June this year in Sydney. Traditionally the Elenex exhibition, run in October this year at the new Melbourne Exhibition Centre, has been the industry's best chance to show off its wares, but according to David Kyle, the organiser of Electronics At Work, there was an opening for a show more focused on electronics. The exhibitors *AEE* spoke to at the event seemed generally happy with the quality of visitors, and the organisers say the show will be on again next year in Melbourne, bigger and better.

In other moves, AWA sold off its defence industries division to British Aerospace Australia and sold its Microelectronics division to US semiconductor company QSI. The company said it wanted to focus on building its communications and entertainment businesses.

Avnet-VSI merged with its cousins from across the Tasman to form Avnet Pacific. The merger involved a substantial restructure and the loss of a few senior executives from the Australian operation.

On the shakier side, HarTec, the former high-tech division of James Hardie reported a drop in revenue of $11 million, bringing its net profit down to just $800,000 and a decision not to pay a final dividend for the year. Chairman David Strong pointed to the generally weak economic climate and decisions by Apple and

Digital Equipment to switch to off-shore suppliers as being primary factors in the poor result.

Interference patterns

The new compulsory electromagnetic compatibility (EMC) regulations take effect from next month and the big question is how many people are ready for them. If our experience is at all similar to the European one, the answer will be hardly anyone. Software company Zuken-Redac surveyed PCB designers in the UK and found 94% unprepared for the EMC regulations which took effect there in January this year. And in an article for *AEE* last month, Guenter Stipek of Siemens wrote: "Most European manufacturer's didn't take action to ensure compliance with the regulations until much later than was desirable."

However, Chris Zombolas of EMC Technologies believes most of the industry are at least aware of the regulations and the manufacturers at the top end of the market are grappling quite well with them. "At the consumer end of the market, such as the PCB manufacturers, there's still a big gap in knowledge. They don't quite know what to do with it," he said.

The regulations are being introduced by the Spectrum Management Agency with the intention of reducing the amount of unintended electromagnetic radiation from electrical products. The effects of the radiation vary from distortion of radio and TV signals to disruption of emergency services communication links. They have been operating on a voluntary basis since the beginning of this year but will become compulsory for all new products introduced after January 1, 1997 and all products will have to comply by January 1, 1999.

Zombolas thinks a lot of the consumer manufacturers had no idea about EMC a few months back but the Spectrum Management Agency has done a very good job of educating the industry about the changes. He thinks it a bit unfortunate they weren't introduced at the same time as the European legislation to prevent dumping of uncompliant product.

He also hoped they would be more comprehensive, like the European rules which included susceptibility to interference as well as emissions in their legislation. These requirements may make it into Australian legislation at a later stage, but they're on hold at the moment because it's not as pressing a problem here.

If we can blow our own trumpet, *AEE* has also published a number of articles on EMC compliance throughout this year. You can consult our index in this issue for a list of them.

The envelope, please

Finally, we present AEE's awards for the year:

Best product of the year goes to a new timing system for horse racing that can measure section times for all horses in a race, instead of just the leader. Considering AEE's woeful performance in this year's Melbourne Cup sweepstakes we need all the extra information we can get.

Worst products of the year are those mobile phones which play irritating little tunes instead of having a normal ring

And **highlight of the year** was the construction of a keg pyramid at Sydney University by engineering students. 120 kegs went into the eight step pyramid and the boys and girls drank every one of them dry — a sure sign 1997 will be a good year after all. ❐

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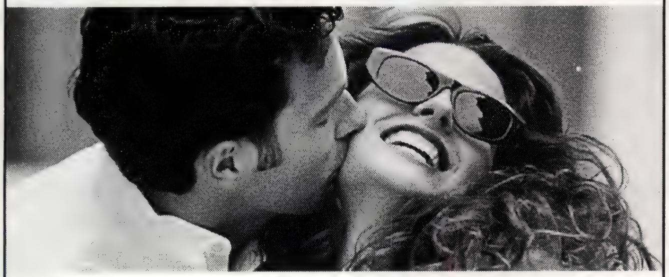

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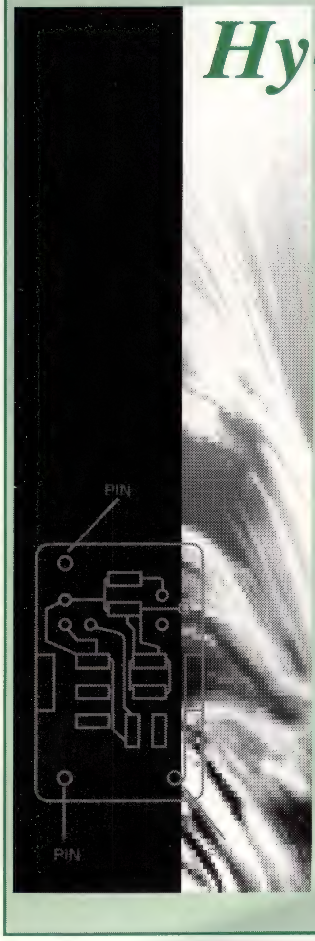

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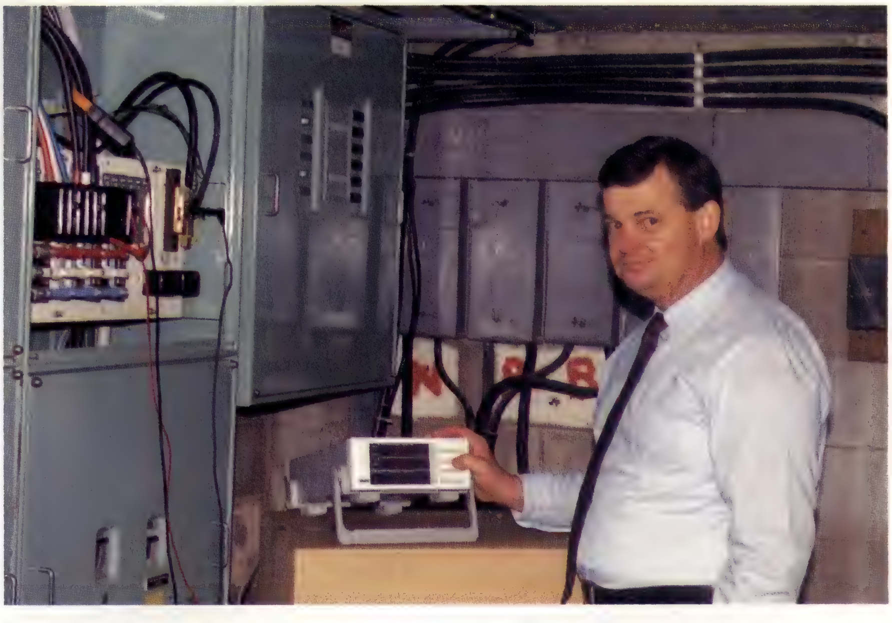
Interference on the line

EMC problems with variable speed drives

Variable speed drives by their nature are prone to causing EMI problems in a plant. Shielding of the drives can minimise radiated interference, but can often push the problems down the supply line. *Lawrie Hitchens* looks at the interference problems of these useful devices.

The subject of EMC is likely to cause many an engineer to break into a cold sweat, either from irritation or from fear at the thought of another layer of complexity being added into an already busy life. Variable voltage, variable frequency (VVVF) drives, often referred to simply as variable speed drives, are used extensively in all kinds of equipment in all types of industries.

While they have become a ubiquitous animal in factories, VVVF drives can be little devils when it comes to interference problems. With new EMC regulations about to come into force in Australia (AS/NZS 2064.2/2 limiting interference for industrial equipment will come into force after January 1, 1997) and the introduction of legislation in Europe, suppliers of variable speed drives and the companies using them are having to pay close attention to the prevention of interference generated by these useful devices.



The author, Lawrie Hitchens, using a Yokogawa WT110 power meter to determine the health of a factory's supply.

The VVVF

The VVVF takes an ac input (normally, three-phase) and converts it in the first place to dc. This is then turned back into a variable voltage and frequency output to drive the motor. Pulse width modulation (PWM) is used to chop the dc voltage into ac. The average of the PWM process is a sine wave, of sorts (see *Figure 1*). The result is current flow through the motor which is more sinusoidal than the voltage, but nevertheless contains significant harmonic components.

The PWM process generates a voltage spectrum with an obviously strong fundamental, being the average of the chopped DC, and a spectrum portion consisting of the chopping frequency and two side bands — one fundamental frequency below and one above chopping frequency. This chopping frequency varies with the drive but is typically somewhere in the region of 1000 to 5000Hz. The influence of harmonic components in the voltage will fill up the gap in the spectrum, although low amplitude components are to be expected.

If you think of the drive as a black box, a useful and simple way of thinking about the EMC side of things will emerge. Electrical energy is being supplied to the drive and energy is then taken out in shaft-watts (or shaft torque in Newton-metres x angular velocity in radians/sec). What happens in between? Some energy is lost in heat; some is lost in 'windage' (the motor fan stirring things up); some is lost in bearing friction; some by induction; and some is lost through radiation.

If an accurate dynamometer were connected to the motor shaft and the electrical input was accurately measured over the same period, an understanding of how serious a potential polluter the drive was would be gained.

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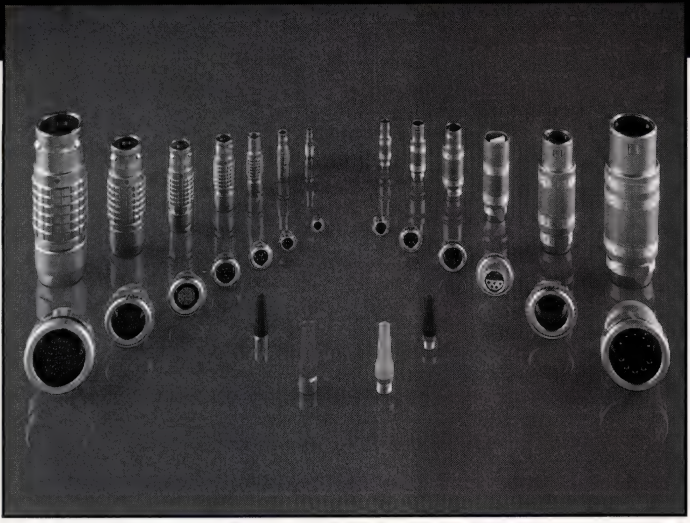

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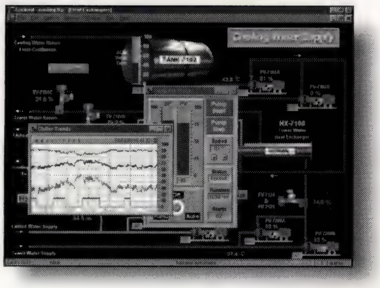

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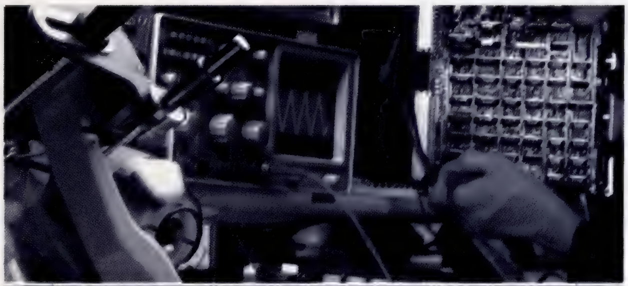

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Conservation of energy

Most attempts at limiting interference concentrate on energy lost by induction and radiation. The question of what happens when these forms of energy loss are limited, for example by filtering and screening, is an important one, however. The principle of conservation of energy effectively says that if it hasn't 'moved through the air' it will have moved down a wire. Effective EM screening can often exacerbate the problem of polluting the supply line. AS 2279.2-1991 says that a plant must not interfere with equipment outside the plant or push harmonics down the line onto points of common connection. Screening VVVF's for EMI can often create problems with pollution of the supply. To effectively comply with the new EMC rules, both radiated and wire-transmitted interference needs to be addressed.

The probability of a plant influencing points of common connection at the sub-transmission level depends on:

- short-circuit impedances between the drive and the sub-station;
- the existence of 'points of resonance', eg. capacitors and stopping inductors;
- the number of similar bits of gear used in the customer's location.

The straw that broke the camel's back

Before you have a regulatory problem with an installation, you are likely to first have an in-plant one. A recent horror story involved a company which installed a small number of VVVF drives in a location where there were already close to a hundred. After the new drives were installed, problems were being seen with the 4-20mA loops throughout the plant. The problems proved intractable and were attributed to faults with the recently installed drives. The hapless supplier was told to take his equipment out. Later it was found that the problem wasn't with the particular drives, but a case of the straw which broke the camel's back — the aggregate harmonic content from the total number of drives throughout the plant had risen to unacceptable levels.

What to do in practice

To determine the likelihood of supply problems with a VVVF installation, a full analysis of the supply first must be done. Get details from the drive supplier regarding the filtering equipment installed on the output side of the inverter, as well as at the input to the converter supplying the intermediate dc link.

The next step is to do some mea-

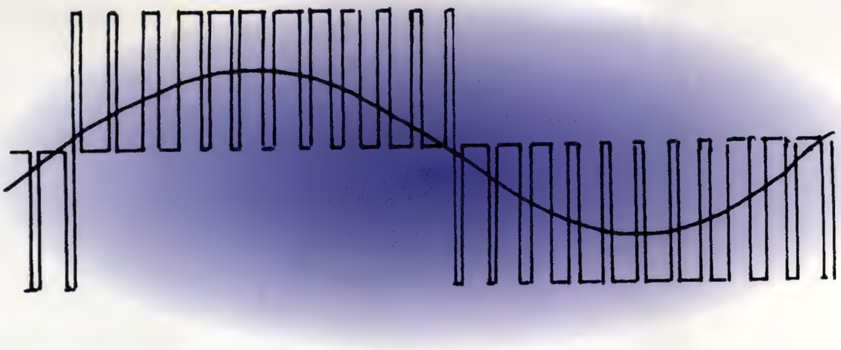

Figure 1. The PWM signal used to power a VVVF drive

surements using capable power measuring instrumentation. The things you should look at are:

- input voltage and its total harmonic distortion (THD) on the supply side of any input filter;
- voltage on the load side of the filter and THD;
- input current and THD on the supply side of the input filter;
- current and THD on the load side;
- power input versus power output (inverter output) over an identical integration period (this gives basic efficiency figures and will provide a good feel for the likely size of any compliance problem);
- analysis of motor cable screen current for fundamental (leakage) and THD (this together with harmonic analysis of the motor input with and without the screen connected to ground will provide you with solid data as to the efficacy of the screen and earthing used).

If you find, after making the above measurements, that the equipment is polluting the supply, what can you do about it? Input filtering will, to a degree, prevent pushing the problem down the line, but may also exacerbate any radiation problem. Better screening and grounding diminishes the radiation side, but helps in conducting the problem out of the drive and onto the supply side. There are no ready solutions other than commonsense ones such as:

- not laying sensitive signal lines next to power cables;
- using separate cable ladders and ducts for power;
- using right-angle cable crosses;
- using single point-earthing, preferably at the metal cabinet of the drive.

Remember above all that with VVVFs, there is no sure-fire way of avoiding interference problems — not even by purchasing compliant equipment! To ensure a plant which uses VVVFs complies with all impending regulations, a thorough examination of both radiated emissions and interference propagated via the supply is needed. ❐

The author is National Reseller Manager with Yokogawa Australia.

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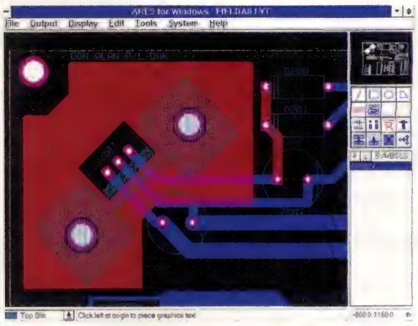

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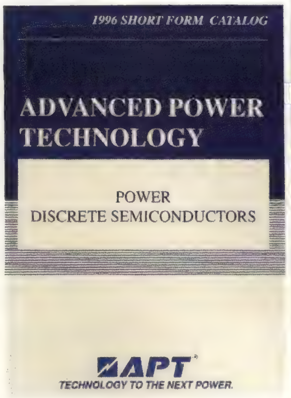

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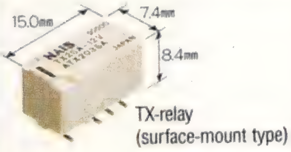

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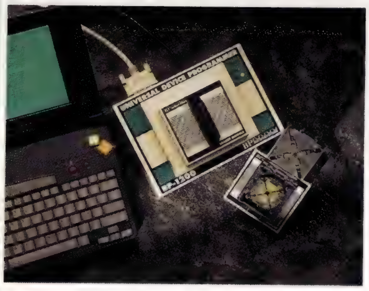

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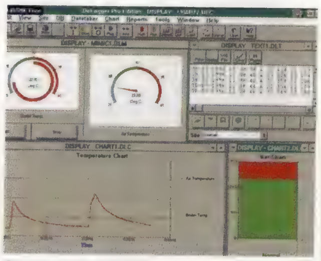

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The catalogue includes product specifications for many of the components listed and full technical details of all products are available on request.

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Design tool for CoolRunner CPLD products

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Power supplies & Batteries

This month's product survey features the latest in power supply & battery products. For more information on any item, complete the Enter Card inserted in this issue and send it in to us.

Lithium-Ion pack supervisors

Reptechnic has released the Benchmarq bq2058 family of Li-Ion Pack supervisors. Li-Ion is an emerging battery chemistry with significantly different characteristics to Ni-based cells and requiring different battery management techniques.

The 16-pin bq2058 controls two external FETs in the charge/discharge path of the battery pack to provide overvoltage, undervoltage and overcurrent (short circuit) protection for three or four series cell battery packs. When a protection threshold is violated the FET is deactivated after a user-set delay. The delay for each threshold is individually set by a single external capacitor. The device consumes less than 40µA during operation and powers down to less than 1.5µA when idle.

Many of the chip's characteristics are mask-programmable during manufacture. Six different overvoltage threshold values are available from ±25mV to ±50mV tolerance. [841](5722)

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VME power supplies

Schroff VME power supplies are now available from Mayer Krieg. The units come in 6U heights with widths from 8HP to 12HP and in performance ratings of 110, 150 and 220W at 50°C.

Features include power factor correction, wide ac input range, EMC compliance (EMC contact strips can be retrofitted into the front panel), international safety approvals to EN and CE, redundancy operation, inrush current limitation, variable current distribution on second and third outputs, external on/off, and high MTBFs. [1740](88)

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600kHz switching regulator

ACD has released the LT1307, a micropower 600kHz fixed frequency PWM switching regulator that operates from an input source as small as a single cell alkaline battery.

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Efficiencies as high as 80% are obtained with 1.5V to 3.3V conversion at 50mA, while operating quiescent current is only 70µA. It comes in an 8-lead MSOP package, less than two-thirds the size of an SO-8 package. [1740](1948)

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60W switchmode supplies

Priority Electronics has released a range of 60W ac to dc switchmode power supplies. They are enclosed in a perforated protective metal case measuring 159 x 97 x 38mm and have easy access to screw terminal connectors for both ac and dc voltage lines.

Using standard convection cooling the power supplies have a working temperature of up to 60°C. The supplies have a universal input of 85-264Vac at 47-63Hz and can be used for local and export market applications. The dc lines are available in single, dual, triple and quad outputs with 5, 12, 15 and 24V.

They are designed with soft-start circuit, limiting ac surge current and short circuit overload voltage protection. The power supplies conform to UL 1012 and TUV EN60950 safety standards, and CISPR22, IEC801 and IEC555 EMC standards. [1740](6090)

ENTER 4403 ON CARD

Customer configurable

The CE-marked CPA250 series of power supplies are available from Priority Electronics. They have four well regulated dc outputs and are customer configurable from 1.2 to 24V at current levels consistent with the total power rating of the supply.

The series exhibits 0.99 minimum power factor at full load with a PFC boost input circuit that supports operation over a range of 90-270Vac at 47-63Hz. It has a hot-swap capability and N+1 load sharing abilities supported by a TTL-compatible power-fault signal that identifies performance degradation of a unit within a group of supplies operating in parallel.

Features include an EN5022/FCC Class B input filter, EN50082-1 electromagnetic immunity, IEC68 shock and vibration compliance, an integral ac input connector and power switch and a choice of Futurebus, quick-disconnect, board-edge, terminal block or power stud output connectors. Overvoltage protection and continuous short circuit protection are standard. [1740](6090)

ENTER 4404 ON CARD

Converters for power supply design

The Texas Instruments TPS6735 converter is available through ACD. It converts a nominal 5V input to a negative 5V output and uses only five external components to deliver up to 200mA from an input as low as 4.5V.

The TPS6735 combines a current-mode pulsewidth-modulation (PWM) controller with an on-chip p-channel MOSFET. Soft start can be implemented using a single external capacitor, allowing the output to ramp to its nominal voltage at a controlled rate. Quiescent current is typically only 1.9mA, and when the -5V output is not required, a logic-enabled shutdown mode reduces current consumption to 10µA (max). Other features include an undervoltage lockout (UVLO) circuit to prevent the power switch from turning on during start up, over-current limiting, and a 1.2V, 125µA reference voltage.

The TPS6735 is suitable for board level dc-dc conversion. Applications include computer peripherals, hard disk drives (HDDs), and a variety of other handheld, portable, and battery-powered designs. It's available in 8-pin DIP and SOIC packages. [1740](1948)

ENTER 4405 ON CARD

NiMH laptop batteries

Premier Batteries has introduced a range of laptop computer batteries compatible with Toshiba, Compaq, IBM and Macintosh computers.

The batteries are fitted with nickel metal hydride cells and are direct replacements for the original product. The company claims the batteries are environmentally safe and offer higher capacity at similar size and weight to nickel cadmium cells. [130](1954)

ENTER 4406 ON CARD

Rugged dc-dc converters

The Melcher IMX 4 series of 4W dc-dc converters is available from Scientific Devices. The package is just 8.5mm high, making it suitable for telecommunications applications where narrow board spacing is essential and is suitable for a wide range of rugged environments including aviation, ship borne, mining and off shore equipment.

The units come with two different input voltage ranges, 8.4-35V and 16.8-75V, and either a single output, 3.3V or 5V, or dual outputs, ±5V, ±12V and ±15V. The output power of 4W is available over the ambient temperature range -25 to 71°C.

The IMX 4 series meets safety standards IEC 950, UL 1950 and EN 60950. They offer an input to output isolation of 1500Vdc, low electromagnetic emissions as well as high immunity to electromagnetic disturbances according to IEC standards. [1740](103)

ENTER 4407 ON CARD

Battery chargers

Amtex Electronics has available the LX family of battery charging power supplies. The units are available in 12, 24 and 48V with others on special request, and with power levels of 200, 350 and 550W with possible expansion for high power battery charging systems.

The output of the units may be adjusted by a potentiometer on board to facilitate different battery manufacturer's recommended float voltage. The units deliver a constant current to a battery until the appropriate float voltage is attained. This voltage will be maintained by the unit. [1740](2807)

ENTER 4408 ON CARD

Rack mounted battery charger

Amtex Electronics has released the CAD600A battery charger and power supply unit, providing 48V/600W.

It is suitable for 19in rack mounting with a height of only 2RU. It provides separate load and battery charging circuits with digital LED voltage and current display.

It features alarms to meet the requirements of DC NO-BREAK systems, including: high volts, low volts, battery off, and load disconnect at low battery voltage. [1740](2807)

ENTER 4409 ON CARD

Constant current for sensors

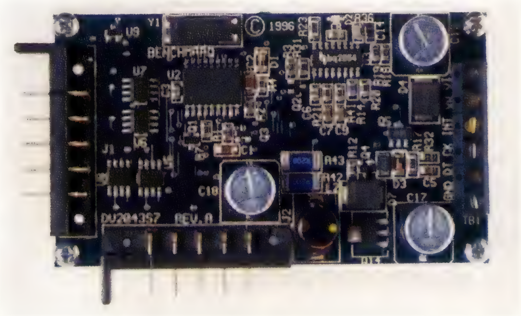
John Morris Scientific has released an amplifier to power PiezoBEAM or sensors with constant current supply. The unit can be used in the laboratory or installed permanently in a panel.

The coupler operates either from batteries from an ac power line adaptor or from any dc source between 6-28Vdc. The coupler warns of a low battery with an intermittent chirping sound. Battery life is approximately 20 hours at a sensor current of 2mA. It offers signal gains of 1, 10 and 100 and selectable high pass filter (time constants of 5 and 25 seconds). Each can be set with sliding switches on the front panel. Plug-in filters allow additional signal conditioning.

The unit also offers a rapid zero feature which makes it ready for measurement two seconds after powering on the unit, or changing the gain or high pass filter. Bias voltage is displayed on three front panel mounted LEDs. A short or open circuit will be displayed immediately. [1740](2039)

ENTER 4410 ON CARD

Smart charger



The Benchmarq DV2043S7 smart charger development system with smart battery selector is available from Reptechnic. It handles switching between external dc and one or two battery packs, automatically switching to dc when it's available and switching between the packs if a battery is removed from the system. It supports stand-alone or system control charging of one or two battery packs.

The DV2043S7 incorporates a Benchmarq bq2054 gas gauge IC and a microcontroller for high-efficiency, low ripple switch-mode design with high-side current sensing.

The board's footprint is the size of a credit card. It provides a development environment for smart charger devices that comply to the 1.0 release system management bus, the level 2 smart charger and the smart battery selector specifications. [1740](5722)

ENTER 4412 ON CARD

Bench top power supply

Computronics has released the 305LDD bench top power supply. The low cost 305LDD has an adjustable output of 30Vdc with peak current of 6A and constant current output of 5A.

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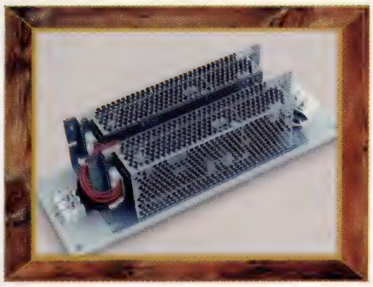

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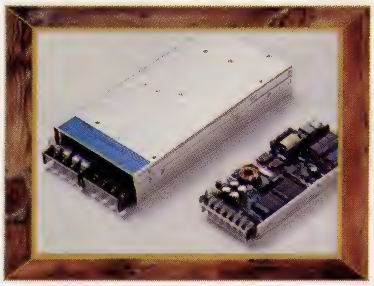

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100mV$_{p-p}$ max ripple. A second digital LCD panel meter displays the instantaneous current value. Variable over-current protection is controlled from the front panel with a manual reset. The 305LDD is housed in a metal case, allowing the units to be stacked vertically. [1740](2602)

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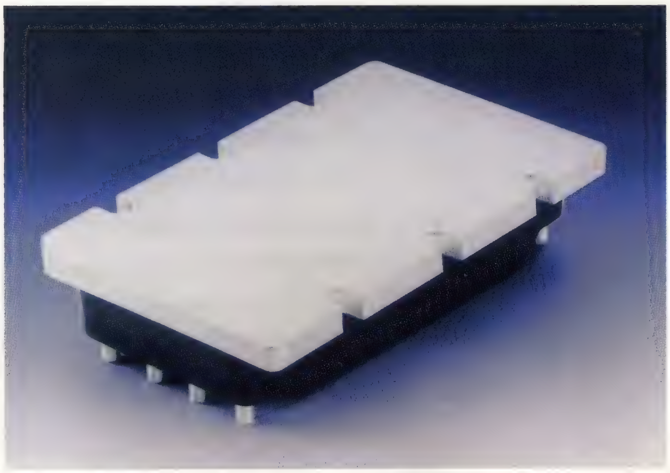
Autoranging ac-dc module



Powerbox Australia has available a micro module from Vicor. The VI-ARM autoranging rectifier module houses the entire front end of a switching power supply. The unit delivers up to 750W at 180-264Vac from a package measuring 36.8 x 57.9 x 12.7mm. The user needs to add a filter and holdup capacitor appropriate to the application.

The VI-ARM can be used with Vicor dc-dc-converters for a high power density, low-profile, off-line switching power solution for systems that require a rugged, full featured interface to the ac mains supply.

Optional EMI filters are also available, FiltMODs are designed to provide 6dB of margin relative to EN55022 when used only with VI-ARM and Vicor dc-dc converters. [1740](5913)

ENTER 4414 ON CARD

Switching power converters

Datel's Unipolar 3.3V output series of switching power converters is available from Quiptek Pacific. The UWR series uses ceramic substrates for enhanced heat dissipation and are designed specifically for high speed SMT manufacturing.

Six different power modules deliver fully isolated, highly regulated, very low ripple power The series covers input voltages from 4.6 to 72V in three different ranges and uses high frequency current mode PWM techniques that allow Datel to achieve total conversion efficiencies of 78% and operating temperature range of -40 to 100°C.

All models incorporate five-sided metal shielding and the base is insulated to allow routing pc board traces directly beneath the package. Outputs are non-latching current-limited with reverse polarity current protection rated at 10mA. Other features include overvoltage clamping, continuous auto-recovery short circuit protection and automatic overvoltage shutdown. [1740](7401)

ENTER 4415 ON CARD

Springs and contacts

Nylon Products Australia has available a line of single and dual battery springs and contacts from Keystone Electronics. The line is manufactured for use with electronic products and incorporates moulded-in battery compartments.

Self-adjusting to accommodate a variety of battery lengths and featuring unique spring-tension capability, the springs and contacts are available in A, AA, AAA, AAAA and N sizes. They are furnished with or without solder tabs for PCB or wire lead mounting. The base plates are manufactured from steel with a nickel finish and the battery spring contacts incorporate high quality precision assembled steel coil springs with nickel finishes. [194](922)

ENTER 4416 ON CARD

Preventing the ups and downs of UPS

Powertel has released the AVPower PA2000 series analyser for measuring the load current crest factor and inrush current so that an uninterruptable power supply can be installed with the correct VA rating.

Because of the uncertainty with complex load current, the UPS rating is often too large or, more seriously, too small. The results can be poor efficiency, premature failing, overcurrent tripping and unreliability.

The problem usually occurs when the load current repetitive peak value is ignored. If all assumptions are made based on true rms measurement, problems are likely. Knowledge of the repetitive waveform peak is crucial to determine if the load current exceeds the UPS maximum peak current capability. [1740](11114)

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ENTER 9435 ON CARD

Programmable ac/dc power systems

The California Instruments i series is available from Obiat. The series combines variable frequency, voltage and current functions in a lightweight ac power source. Applications include production testing, quality control and aircraft power simulation.

The series is microprocessor controlled and operated from a front panel keypad. Functions are grouped logically, eliminating the need to search through various levels of menus. A large shuttle knob next to the display allows most parameters to be slewed up or down dynamically. By using a dynamic rate change algorithm the knob can do precise adjustments as well as quick sweeps through the range.

The 5001I is a general purpose ac power source for both development and manufacturing applications. Just 178mm high it has a very high power density. Rated output levels for the series vary from 5000VA for a single unit configuration to 15,000VA for multi unit configurations. [1740](1826)

ENTER 4418 ON CARD

Shielded battery strap

Nylon Products Australia has available a new 9V battery strap from Keystone Electronics. The battery strap has a shrouded cover designed to prevent tampering and reducing the likelihood of the battery contacts coming into contact with other conductors.

In applications where sensitive electronic circuits, equipment or systems are present, the insulating cover also prevents unwanted electrical discharges caused by unintended grounding. The design protects the battery from dust, dirt, contamination and physical damage which can occur during battery installation, charging, handling and storage.

The moulded construction includes an integral wire lead strain relief feature and riveted-in male and female contacts. The contacts are manufactured from spring steel with nickel plate while the base is moulded from high strength, impact resistant polypropylene. [794](922)

ENTER 4419 ON CARD

Switched-capacitor voltage inverters

Analog Devices' ADP3603 and ADP3604 switched-capacitor voltage inverters are available from ICD. They deliver a regulated output with high efficiency and low voltage loss, and eliminate the need for high-cost external inductors. The ADP3603 and ADP3604 provide up to 50mA and 120mA of output current, respectively, with ±3% output error over their 120kHz switching frequency. Output ripple is only 15mV and 25mV, respectively.

The regulators dissipate less than 400mW of power. Users can enable a fast shutdown mode in less than 5ms, dropping quiescent current to 1.5mA — suitable for use in, computer peripherals and add-on cards, portable and battery powered instrumentation, pagers and radio controlled receivers, disk drives, and mobile phones and other communication devices.

They are designed primarily for use as high frequency voltage inverters and negative voltage regulators. Output is fixed at -3V from input voltages ranging from 4.5 to 6V. Both are available in small-outline 8-pin SOICs. [1740](13234)

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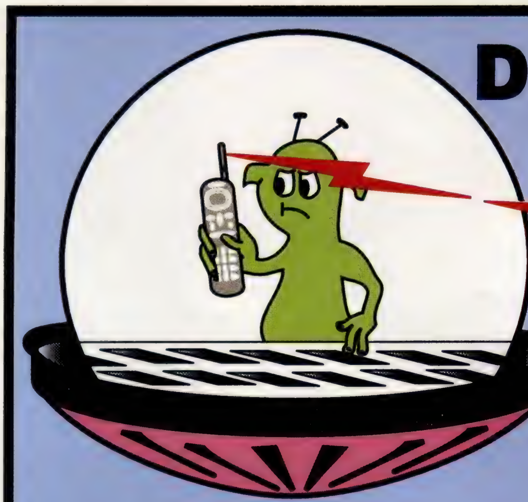

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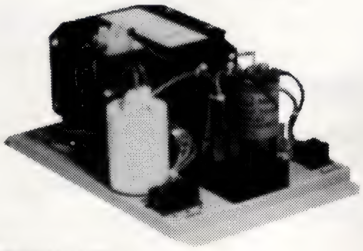

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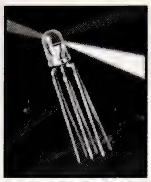

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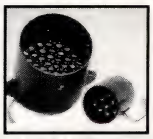

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UPS with management software

Online Control has released the PowerRite Max UPS bundled with Deltec power management software, LanSafe III (for networks) or FailSafe III (for stand-alone systems).

The PowerRite Max is available in 450, 700, 1000 and 1500VA sizes. It uses advanced battery management so the user is alerted by a 60-day service warning before the batteries expire. Hot swappable batteries are also available if the battery needs to be replaced without powering down the connected load.

It incorporates a network/modem surge suppression jack and is able to protect network cabling, modems, fax machines and electronic equipment connected with network lines. The PowerRite Max also has front panel status indicators, audible alarms, an RS-232 communications interface, is MIB II compliant, and available with 10Base-2 and 10Base-T support. [1740](298)

ENTER 4421 ON CARD

Programmable dc-dc converter

ICD has available a programmable dc to dc converter from Micro Linear. The ML4950 allows engineers to set its output to match the voltage requirement of the chips they are using, as well as match lower voltage requirements in the future.

The output level is programmed to any voltage in the range of 2-3V via two small external resistors. A small inductor and two small capacitors are the only other required external components. The chip can supply up to 100mA of output current.

ICD also has the ML4850 version which can be specified to have a fixed output of either 2.2 or 2.5V. This eliminates the need for external programming resistors. The chips convert and regulate the voltage from a single alkaline battery in the range 1-1.5V into a steady output with an accuracy of ±3% and an efficiency in excess of 90%. The chips also work with single cell batteries such as nickel metal hydride (NiMH) or nickel cadmium (NiCd). [1740](13234)

ENTER 4422 ON CARD

CCFL power supplies

Veltek has released the MAX1610/MAX1611 power supply ICs from Maxim Integrated Products. Each drives a cold-cathode fluorescent lamp (CCFL) and is a high efficiency device that maintains the CCFL brightness constant (despite V_{IN} changes) by regulating the lamp current. The V_{IN} range is 4.5 to 28V.

Each IC includes a high frequency power switching MOSFET that enables the use of small, thin external magnetic components. Driving the CCFL from an isolated transformer-secondary winding improves efficiency and prevents flicker at dim tube settings. The MAX1610/Max1611 devices protect themselves against open or shorted lamps and accommodate floating lamp designs. Both include a linear regulator that eliminates the need for a separate logic supply.

Brightness can be adjusted by scaling the lamp current or chopping the CCFL on and off at a rate faster than the eye can detect. The MAX1610 provides digital inputs that let you adjust brightness on an internal 5-bit up/down counter. The MAX1611 has a 2-wire serial interface that lets you set the brightness directly. [1740](3946)

ENTER 4423 ON CARD

No-break power supplies

Innovative Energies has released the No Break SR range of switch mode power supplies. They were designed and developed by the company and are available in three main versions: standard power supplies, intelligent battery chargers and no-break power supplies.

They are designed for applications involving high reliability, battery backed up DC power systems in telecommunications and telemetry remote area installations, security systems and industrial control/PLC systems. The range includes models from 100 to 250W with 500W models available soon. It can cope with input voltages of 90-

132Vac and 180-264Vac. Outputs of 12, 24, 48 and 110Vdc can be provided.

In the "no-break" system, an independent constant-current charging circuit charges the batteries while the main output from the supply powers the load. In the event of mains failure, the load is immediately supported by battery with very low decoupling losses. A disconnect function operates when terminal voltage has fallen to 83% of nominal to prevent deep discharge. [1740](8941)

ENTER 4424 ON CARD

Switch mode power supply chip

Braemac has released the TOP209 switch mode power supply IC from Power Integrations. The TOP209 is part of the Topswitch family and optimised for low power standby applications.

The device can deliver up to 4W from a 100/110/230Vac input or 2W from a universal supply (85-165Vac). It integrates a PWM controller and a 700V power MOSFET in a single die and requires only three pins to perform power supply switching and control functions.

Other features include a high voltage start-up bias circuit, bandgap reference, bias shunt regulator/error amplifier for loop compensation and fault protection circuitry. Thermal shutdown with hysteresis is also available for standby applications. [1740](4274)

ENTER 4425 ON CARD

Configurable dc-dc power supplies

Vicor's VI-200 family of modular dc-dc converters is available from Powerbox Australia. The components power products are for use in the development of advanced power supply systems.

Configurable solutions are available such as Vicor's ComPAC. It combines one to three dc-dc converter modules and a dc input front-end in a compact low profile aluminium case. Input voltage ranges are designed to meet the requirements of telecommunication and industrial markets.

The ComPAC combines EMI attenuation and transient overvoltage suppression. The dc-dc converter's inherent low noise performance couped with an EMI filter enables the ComPAC to meet stringent noise limits. [1740](5913)

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Thanks for your support and have a great Christmas. See you in 1997.

Keeping backup batteries healthy

Batteries are used to provide backup power in many systems when the mains supply fails. To ensure backup batteries are fit for the task you must keep them in good health at all times. In this article we look briefly at some of common battery ailments and how to cure them.

When designing a battery-backed dc power system, it pays to remember that all forms of battery wear are cumulative on the plate structure and active materials. Because of this, lead acid batteries often do not meet the expectations of the user and can fail prematurely. It's easy in such cases to put the blame and poor quality batteries, but quite often the reason for untimely battery failure is a poorly designed or controlled charging system. A good battery charger with specific key features will ensure the expected life of the lead acid battery is obtained in practice.

By keeping in mind and avoiding the common causes of premature battery failure discussed below you can expect to get the full rated life from your backup batteries. With any system, however, you should also regularly test the backup battery to ensure that is healthy enough to provide the necessary power when called upon.

What damages batteries and how to avoid these factors.

Deep discharge — Batteries should never be allowed to completely discharge and remain connected to the load. If a battery is discharged to below 1.8volts/cell and left connected to the load for more than say 15 minutes, the cell with the least capacity discharges first and suffers reverse charging as load current flows through it. This is extremely damaging to that cell. Batteries typically will recover from this perhaps only up to about five times.

The solution is to use a charger/system with an end-of-discharge battery and load disconnect relay (adjustable set point and self re-setting preferred). The relay will disconnect the battery from the load before damage can occur.

Battery short circuit — When the battery is short circuited for more than 15 seconds it can be quite badly damaged and the user can no longer be assured of a long and reliable float life.

Damage to the battery from a short circuit can easily be avoided by protecting the battery using fuses, circuit breakers or electronic methods, such as current-limiting the output.

High float or boost voltage — A battery can be damaged if held at an inaccurate float voltage (often caused by temperature variations in the battery) or boost voltage for any 'length of time' (say more than a week) ie. it is gassed and vented.

Using a good quality, well regulated charger with accurate temperature compensation of float and boost voltages will avoid this problem.

High ripple current — A problem can occur when the battery and charger are left connected to a fluctuating load for several months and the load or charger produces a high alternating ripple current in the battery.

Again, use a good quality charger with a suitably low output impedance and fast transient response capabilities, thus ensuring accurate response to load changes without loading the battery. This is particularly important in installations with potentially 'dirty' mains supplies, such as in factory which use a number of variable speed drives. If in doubt, you should conduct an analysis of the mains supply to the charger to see if there is likely to be a problem.

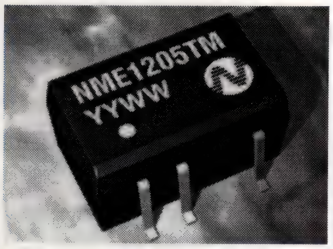
Time — When the battery has been through more than 100 discharge cycles or equivalent and has spent 1.5 years or more on float charge it may be approaching the end of its useful life. This number of discharge cycles combined with the long float service life will have worn the battery plates sufficiently to warrant the removal of the battery from the critical application. At this point the user may wish to test the battery to destruction in order to gain valuable data and experience for reference at other similar sites/applications.

By keeping the preceding points in mind you should be able to design or purchase a reliable backup power system. By there very nature, backup power systems come into use only occasionally and sometimes in critical or emergency situations. It is important to ensure that the system is reliable and will always work when called upon. Choosing an intelligent and well designed charger that includes circuitry to avoid the common battery problems mentioned above will go a long way to ensuring the long-term reliability of any system. ❐

This article was supplied by Innovative Energies. Further information can be obtained from the company's Web site at http://www.innovative.co.nz/.

newport components

1Watt SMD DC/DC Converter Ideal For Automated Insertion



The Newport NMETM series 1Watt surface mount DC/DC converter has been specially developed for wave soldering and withstands temperatures up to 280°C. The circuitry is identical to the popular NME with its 10 year proven reliability. The series provides 5, 9,12 and 15V outputs from 5 and 12V inputs and is ideal for isolating or converting DC power rails having 1 kVdc isolation. Power density is 1.68W/cm³.

Call for full specs on the NMETM and a copy of the Newport Power Components Data Book

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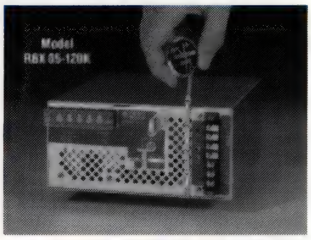

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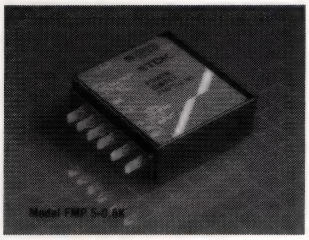
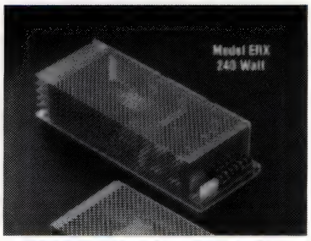


Miniature OEM Switching Modules
3 to 10W



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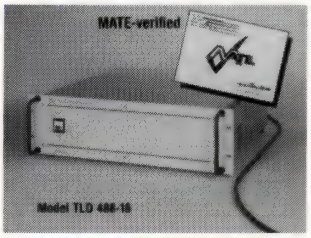

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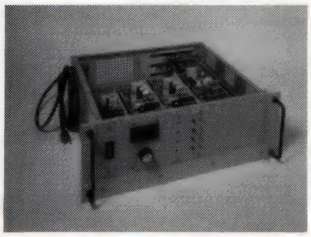

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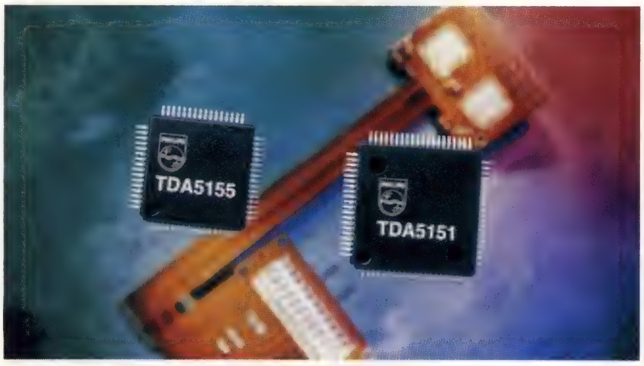
Magnetoresistive pre-amps



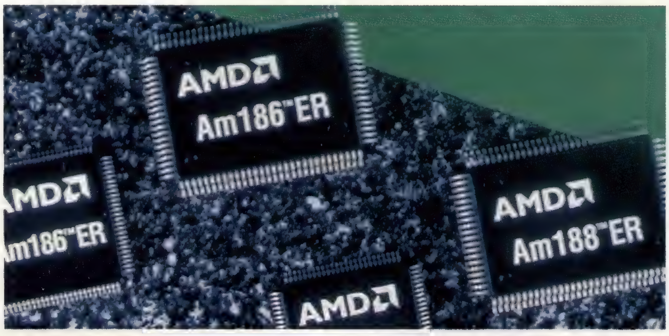
Philips Semiconductors has released a family of high performance, low noise pre-amplifiers for dual-stripe magneto-resistive (DSMR) heads. The TDA5151, TDA5153 and TDA5155 offer twelve, six and ten channels respectively. The devices incorporate a serial interface which makes the pre-amp easier to adapt and monitor, and reduces the number of pins and lines previously necessary.

The devices are suited for data rates ranging from 100-200Mbps. They can distinguish between differential signals as signal and common-mode effects as interference which is then rejected. The area density is increased allowing the heads to yield two to three times the amount of data on the same surface.

Other features include: programmable servo writing which signals multiple heads simultaneously, programmable high frequency gain boost, programmable head select which saves pin count by assigning control to three lines and measurement of MR head resistance. [811](4180)

ENTER 4427 ON CARD

Microcontrollers with on-chip memory



AMD's Am186/88 ER microcontrollers are available from Avnet Pacific. The core has been shrunk through 0.35 micron technology allowing cost effective on-chip integration of 32K of RAM. This reduces the needs for external SRAM.

When used with 70ns flash memory, these microcontrollers deliver 386-level performance at a 16-bit price. They are suited for a wide variety of memory intensive applications in networking, telecommunications, mass storage, industrial control and handheld devices, such as cellular phones, personal digital assistants and global positioning systems.

They operate on 3.3V with 5V tolerant I/O and are available in a choice of 100-pin TQFP or PQFP packaging in 20, 25, 33 and 40MHz frequencies. Members of the E86 family feature serial communications, timers, DMA, programmable I/O, a glueless bus interface, chip selects, an interrupt controller and x86 compatibility. [390](19612)

ENTER 4428 ON CARD

Gang programmer

Alfa-Tek has available the Speedmaster GLV-COP gang programmer. It can download, program and verify in 4 seconds. All programmable features of the National Semiconductors COP8 are supported, including RAM size and security and oscillator type.

Specially designed 44-pin and 68-pin PLCC adaptors and eight 28-pin SOIC adaptors can be fitted into the programmer giving 8-way support for all COP8 package types. Eight 40-pin sockets ensure that no devices in DIL packaging require additional modules.

It can be configured from the PC to work in stand-alone mode with an internal Flash memory storing the selected device algorithm, configuration information and program data. On a subsequent power up, the programmer displays a code which tells the operator which device it's configured for and it is immediately ready to start programming devices. [388](696)

ENTER 4429 ON CARD

Single-chip digital modem

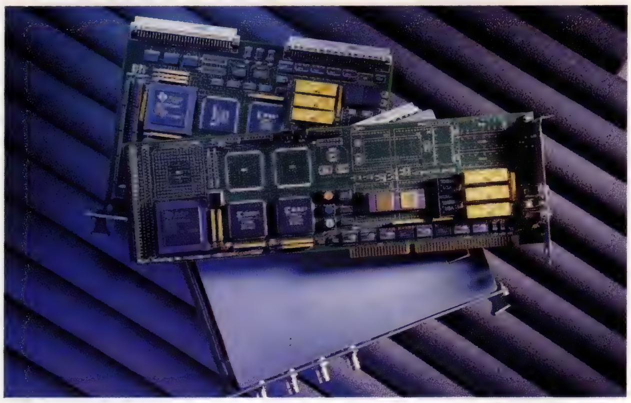
The LXT441 single-chip digital access modem from Level One Communications is now available through ACD. It allows networking and data communication OEMs to add low cost wide area networking connections for frame relay and Internet remote access applications.

It enables full duplex communication of end-user data at 56 or 64kbps through a 4-wire twisted pair leased line or private/public network facilities. It features a data communications equipment (DCE) interface which connects directly to logic level terminal signals or popular serial controllers, so the device supports switched 56 call processing via request to send (RTS) and data terminal ready (DTR) control leads, or by an inexpensive microcontroller.

Potential applications for the LXT441 include leased-line DDS and switched 56 DSUs and Internet service provider equipment. It can also be integrated as an internal DSU into routers, bridges, PC add-in cards, FRAD and office channel units (OCU) cards for channel banks and digital loop carrier (DLC) systems. [370](1948)

ENTER 4430 ON CARD

Bus drivers



Advanced Systems has available two MIL-STD-1553 interface products, the GoldPlus cards from Digital Technology.

The GoldPlus/M boards, available in PC, VME and VXI versions, can simulate a bus controller, multiple remote terminals and a bus monitor with the ability to operate in all modes simultaneously. They can also inject errors into the 1553 bus traffic for test purposes.

The GoldPlus/S boards are microcode based single function 1552 boards. They have the same capabilities as the GoldPlus/M boards with the exception of error injection and simultaneous mode operation.

Both the GoldPLus/M and GoldPlus/S boards are software compatible so engineers can develop one application software program for multiple applications. Software developed for a card in either family can be reused on any other card in either product line. [394](47)

ENTER 4431 ON CARD

Subminiature capacitor

Vishay Components has released a new subminiature capacitor that can package 1µF in minimum space. The capacitor is part of the Vishay Roederstein Series MKT 1823.

It is rated at 40Vdc and provides radial leads with 2.5mm spacing. Typical uses include blocking, bypassing, filtering, timing, high frequency coupling and coupling of fast digital analogue ICs as well as interference suppression in low voltage applications.

The Series MKT 1823 provides capacitance ratings from 0.001 to 1µF with tolerances of ±5, 10 and 20%. Voltage ratings are 40, 63, 100 and 250Vdc depending on the model. All models are encapsulated in flame retardant cases which meet UL Class 94 V-O. [792](19065)

ENTER 4432 ON CARD

Flat panel computer

AJ Distributors has introduced the DisplayPac-MiniBrite, a Pentium-based flat panel computer from Computer Dynamics, which brings the capabilities of a colour VGA graphics display into space-limited applications.

The DisplayPac-MiniBrite features 4096 colours, 640x480 resolution and a 5.2x3.8in viewing area. The panel has a normal luminance rating of 120nit but is also available with an Ultra-HiBrite option which increases it to 450nit and extends the backlight life to 40,000 hours, or four times normal.

PCI bus is used for critical on-board functions — video controller, ethernet interface and IDE hard disk interface. Other on-board features include 512K cache, two serial ports and a parallel port, up to 64M DRAM, a floppy drive controller, and a keyboard/mouse controller. Users can expand system functions through the PC/104 or ISA bus interfaces. [392](67)

ENTER 4433 ON CARD

The **VR 100 View Recorder** from *Yokogawa* samples measurement data digitally from up to six channel inputs at high speed (125ms 1-4 bits) and with 14 bit resolution. This enables it to reliably detect rapid and small changes the could be missed by a conventional detector. [1960](1313)

ENTER 4434 ON CARD

Tech-Rentals has available for hire the **Pathfinder PF610 circuit tracer kit**. It is designed primarily to trace power cabling but works on other types, including coaxial. It comprises a handheld transmitter and receiver. [1470](167)

ENTER 4435 ON CARD

Sensit has released the **Aaeon industrial quality flat screen displays**. TFT, EL and LCD displays are available with or without resistive touch screen. They includes a 32-bit PCI-bus SVGA controller for CRT. [392](21087)

ENTER 4436 ON CARD

Optical Systems Design has released the **OSD136 synchronous/asynchronous RS232 fibre optic modem.** It provides full duplex RS232 communication over distances of up to 5km of commonly available multimode optical fibre. [1590](2814)

ENTER 4437 ON CARD

Nucleus Computer Services has available the **3202 DRAM tester**. It tests the performance of all types of RAM chips including SIMM, SIPP and DIMM modules up to 128MB maximum capacity. [2470](2093)

ENTER 4438 ON CARD

Electronic Development Sales has released a **high speed microwave detector** from Miteq. The gallium arsenide detector has been developed for demodulating ultra high speed data streams. The input RF power at the transition between square law and linear operation is approximately -10dBm. [1540](4170)

ENTER 4439 ON CARD

The **Exemplar VHDL Discovery Kit** is available from *EDA Solutions*. It's aimed at Windows-based FPGA designers moving from schematics to VHDL-based design methodologies and offers a migration path to Exemplar's Galileo and Leonardo design environments. [690](2353)

ENTER 4440 ON CARD

Jtec has released the **J7000 InterXchange**, an ATM based broadband switch catering for multiservice network environments. It supports voice and video services and provides Ethernet, ATM and other interfaces. [810](1245)

ENTER 4441 ON CARD

ICD has released the **QS75436** from Quality Semiconductor. It's a second generation device in its new and proprietary shared port RAM family and can move data at 3.6Gbits/s. [841](13234)

ENTER 4442 ON CARD

Intelligent Systems has released the **PI-543 4-port RS-232 card**. It has four ports for asynchronous communication, is a multi operating system, interrupt selectable, I/O selectable and suitable for any BBS and POS system [394](19267)

ENTER 4443 ON CARD

Handheld transmission test set

Computronics has released the AR-188T handheld transmission test set. It features several analytical functions including the TIMS, impulse, hits, phase jitter, amplitude jitter, return loss and peak to average ratio measurements. The menu driven operation is performed via a rotary selection switch and push-button keypad.

In the TIMS mode you can transmit and receive signals from 20-50Hz. The tests et can measure signal levels from -60 to 10dBm resolution. It will also detect noise levels from 10 to 100dBm with 1dBm resolution. The autorangeing measurements are constantly monitored via a backlit LCD full message display and a dialling generator is integrated for activating remote 2wire/4 wire responders.

The AR-188T is supplied with a complete accessory kit which includes removable stand, rechargeable battery, ac adaptor, and two Bantum to alligator test leads. Each test set includes a soft carrying case for field service applications. [1270](2602)

ENTER 4444 ON CARD

EMC-compliant RS-232 transceivers

ICD has available a family of ±5V RS-232 transceivers from Analog Devices which meet European EMC requirements. The ADM2xxE product line provides ±15kV of ESD (electrostatic discharge) and ±2kV of EFT (electrical fast transient) protection.

The family of five devices is designed for modems, printers, laptops and notebook computers. Operating from a ±5V supply, they come with latch-up protection, immunity to high RF fields and allow for operation in unshielded enclosures and electrically harsh environments.

The line offers a variety of driver/receiver combinations in SOIC and SSOP packaging. They offer a pin-compatible upgrade for existing industry-standard ±5V RS-232 transceivers. They also feature 17mW power consumption, 230kbits/s data transmission, a 1μW shutdown mode and operation over -40 to 85°C. [370](13234)

ENTER 4445 ON CARD

Brushless micromotor

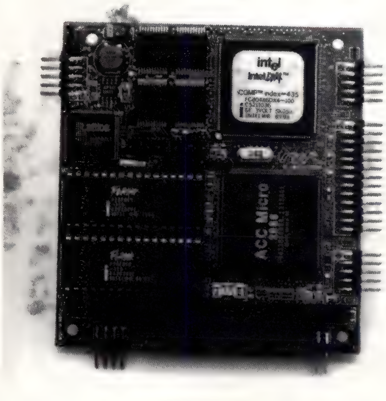
Erni Australia has released the 3513 brushless dc micromotor. It combines the ironless skew wound coil technology, System Faulhaber, and integrated drive electronics.

Features include simple two-wire dc-voltage operation, integrated drive circuit, brushless commutation and a dynamically balanced rotor. The motor measures 31mm in diameter and 53mm in length with a solid 4mm output shaft. Speed ranges from 500 to 6500rpm and stall torque is up to 30mNm. The lifetime is limited only by the pre-loaded ball bearings.

The series was developed for applications of continuous duty operation such as small pumps, fans, choppers and scanners, in both industrial and medical instruments. [804](117)

ENTER 4446 ON CARD

Control module



Wells Electric Drives has released the CMV486DX4 CPU module from Real Time Devices. It combines the performance of a 486 computer with the functionality of embedded DOS controllers on the PC/104 form factor for industrial control. It can be stacked with PC/104 utility modules, data modules and expansion cards to create complete systems for embedded control and data processing.

The module includes a 100MHz Intel 80486DX4 processor, 32 bit memory bus, internal maths coprocessor, PC/104 bus, 4 or 8MB DRAM on board, and two 32 pin solid state disk sockets for 2MB EPROM or 1MB Flash, SRAM or NOVRAM. Two RS232 serial ports, a bi directional parallel port and watchdog timer are provided. [380](21284)

ENTER 4447 ON CARD

Accelerated debugger

Mentor Technologies has available Version 4.0 of the Microtec Spectra Development System. Spectra is an open and scalable embedded integrated development environment (IDE) which can be used to accelerate the edit-compile-debug cycle and efficiently debug multiprocessor and multiboard real-time and embedded applications.

Included in the system are C and C++ compilers, the new XRAY Pro debug suite and the VRTX real-time operating system. Spectra scales to work with the full range of embedded applications, from highly resource constrained systems with no RTOS requirements up to complex resource intensive systems.

It is also an open environment allowing the integration of additional tools from third party vendors and developers. It includes a set of published application program interfaces (APIs) and dynamically linked libraries (DLLs) — from the device driver interface and the host target connection to intertool communication services. [384](139)

ENTER 4448 ON CARD

Communication Controller Board

The Motorola PowerCom MVME1300 VME board is available from VME Systems. The PowerCom series is a family of wide area network communication controllers that provide up to eight synchronous/asynchronous serial ports which can operate at speeds of 2.048Mbit/s.

Based on Motorola's MC68360 Quad Integrated Communications Controller (QUICC) coupled with the high performance PowerPC 603, PowerCom is suitable for applications requiring powerful CPU performance and extensive protocol processing such as those found in the telecommunications industry.

PowerCom uses the high performance 66MHz Power PC 603 for efficient board level protocol processing. Lower protocol layers are handled by the QUICC's on-chip intelligence while higher layers are processed by the MPC603 before being transferred to the CPU. It also uses a PCI local bus and the related PMC interface. Its synchronous/asynchronous serial ports are available via the employment of one or two MC68360 based PMC cards. [394](954)

ENTER 4449 ON CARD

Bus with a deathwish

Micromax has released the Turck *sensoplex* IS sensor-actuator bus system for use in potentially-explosive hazardous areas. It provides direct interconnection of field devices to a controller via a single coaxial cable.

Inputs and outputs can be added without shutting down the entire process. Testing can also be done with the system live and exposed to the hazardous areas. Damaged sensors/actuators and cables can be replaced without affecting the rest of the system.

The *sensorplex* IS uses the deterministic master-slave principle to read-write, monitor up to 180 input or output points in the hazardous area in less than 5ms. Power for operation, data and I/O functions are combined on a coax cable utilising 24Vdc in the safe area. The bus manages the power so the power source does not have to have special ratings. [394](6833)

ENTER 4450 ON CARD

Low cost in-circuit emulators

The Microtek EasyPack 8052F series of low cost real-time in-circuit emulators is now available from Macro Dynamics. They support the design, development and debugging of 8051 derivative single chip and expanded mode microcontrollers. It has a Windows-based user interface which provides C and assembler level debugging.

The emulator has 128K of code and data overlay memory which can be mapped as internal, external, read only, guarded or combined. Multiple memory windows can be opened to allow the display and modification of data in each of the processor address spaces.

The EasyPack 8052F includes, as standard, a 32K frame 40 bit wide real time trace buffer which captures in real-time, 16 bit address, 8 bit data, 3 bit status, 5 external bits and a selectable 8 bit data port. Two levels of event triggering are provided to allow complex triggering of the trace. [690](3032)

ENTER 4452 ON CARD

Colour oscilloscopes

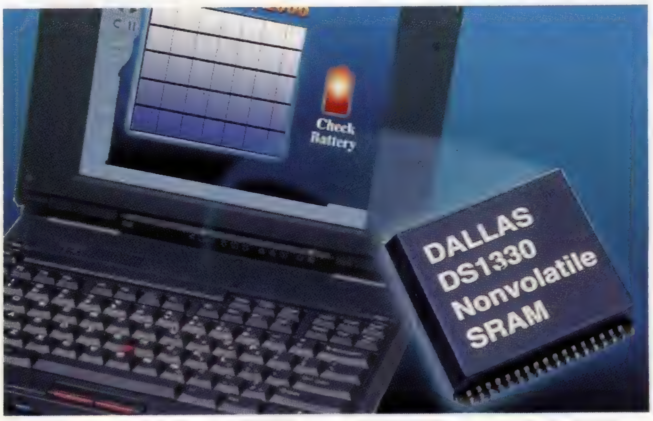
Scientific Devices has available six high performance colour oscilloscopes from LeCroy. The LC334 and LC534 families have high performance waveform capture, measurement and analysis capabilities. An analogue persistence display mode as well as an information-rich implementation of colour can be viewed on a bright 9in colour CRT.

Advanced capabilities are available to capture complex signals, measure and analyse them. For example, when examining jitter a histogram can be drawn to show the exact distribution of timing aberrations. When examining multiple signals on the screen colours can be made transparent so the shape of each signal can be seen even when they are laid on top of each other.

The front end features 500MS/s on each channel with 500MHz bandwidth for the model LC334 and 1GHz for the LC534. The acquisition memory and ADCs of inactive channels can be combined onto the active signals allowing sampling of 1GS/s when using two input channels or 2GS/s maximum in single channel mode. [1270](103)

ENTER 4451 ON CARD

Memory with monitor and reset



The Dallas Semiconductors surface-mount NV SRAM modules are now available from Veltek Australia. They feature a built-in battery monitor and CPU reset, and reduced power consumption. Initial DS13 series products include the DS1330 (32k x 8), DS1345 (128k x 8) and DS1350 (512k x 8).

The battery monitoring circuitry applies a carefully selected load to the battery every 24 hours. If the voltage is less than 2.6V the battery warning pin is activated. The CPU reset function serves both as a power-on reset during system power-up and a power-fail reset during system power-down.

The DS13 series offers ten years of data retention at 25°C. They come in a 34-pin low profile module package. This snaps directly into a standard 68-pin PLCC socket. It protects the internal lithium battery from the high temperatures of reflow soldering. [841](3946)

ENTER 4453 ON CARD

Single mode graphics controllers

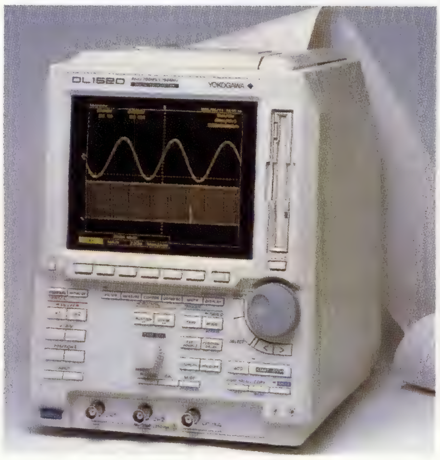
The IP-SVGA and IP-UVGA single mode graphics controllers are available from Unitronix. They can support resolutions from 320 x 200 in 16.8 million colours up to 1280 x 1024 in 16 colours. Input ports for a PC-compatible keyboard and mouse are provided and a transition panel is available providing industry-standard connectors.

Based on the Cirrus Logic GD 5428 processor, the IP-SVGA is available with 512K of display memory while the IP-UVGA has 1MB. The display memory can be directly addressed by the host CPU via a high speed write buffer. Fast screen re-draw id provided by an on-chip BitBLT engine and screen refresh rates up to 87kHz are supported.

Software support is available for the OS-9 real time operating system and a port of MGR is available to enable the IP-SVGA to be readily integrated into both new and existing systems. [382](3260)

ENTER 4454 ON CARD

Scope for improvement



Yokogawa has released the DL1520 digital oscilloscope, a two channel instrument with a maximum sampling speed of 200MS/s and bandwidth of 150MHz, processing repetitive signals with an equivalent speed of 20GS/s. In the envelope mode of operation, the instrument will capture events with durations as short as 20ns.

The DL1520 is equipped with powerful extension functions including arithmetical operations and FFT analysis. Screen displays can be saved in TIFF, BMP, Postscript and HPGL formats on the standard supplied floppy MS-DOS compatible disk drive.

The memory length is a maximum of 20kWord (in roll mode). It also has an in-built printer so can be used as a real-time recorder with an equivalent maximum chart speed of 16.7mm/s. The screen updates 60 times a second even when mathematical functions or envelope peak detection modes are employed. Communications options available include GPIB, RS 232 and a combined GPIB and Centronics interface. [1270](1313)

ENTER 4455 ON CARD

Namlea has available **Positronics V.35 connectors**. Contacts are precision machines out of solid copper alloy. Termination styles include crimp, PCB straight and 90°, press fit and wire wrap. A new addition to the range is an EMI/RFI hood. [794](4517)

ENTER 4456 ON CARD

Alfa-Tek has available the **ICEmu-51/UNI real time in-circuit emulator**. It is aimed at standard 8051 kernel microcontrollers (emulation clock frequencies of 18, 24, 33, 42MHz) and Dallas high speed microcontrollers (13, 18, 25, 22MHz). [690](696)

ENTER 4457 ON CARD

Richard Foot has released **Dust-Off** for the removal of dust and other debris from electronics, electrical, photographic and computing equipment. It is 100% CFC free, non flammable and formulated in Australia. [790](21285)

ENTER 4458 ON CARD

Warth International's **EMC sample kit** is now available from *Clarke and Severn*. The kits include state of the art shielding products such as RF shielding gaskets, shielded windows, conductive tape and laminates. [2270](2473)

ENTER 4459 ON CARD

Computronics has released the **Chip Quik kit** that enables reliable removal of surface-mounted devices and other multiple-connection components from PC boards without damaging the board or component. [790](2602)

ENTER 4460 ON CARD

Veltek Australia has released the **MAX534 D/A converter** The serial-input voltage-output device comes in a QSOP-16 package with the same board area as an SO-8. The interface is compatible with SPI, QSPI and Microwire standards. [388](3946)

ENTER 4461 ON CARD

Adilam Electronics has available the **Cherry Sensor Type HE 6450**, a magnetically activated Hall Effect vane switch. It is suited to applications requiring the ability to withstand hostile electrical, chemical and mechanical environments. [810](25)

ENTER 4462 ON CARD

Kenelec has available the **ADS1286 sampling A/D**. It comes complete with a fully differential input and sample/hold amplifier. It is suited for remote and isolated data acquisition, transducer interface and battery operated systems. [388](4)

ENTER 4463 ON CARD

R&D Electronics has available the **Xicor X9316 E^2POT**. It is designed for battery-powered systems and incorporates an advanced architecture which features lower noise and reduces the required standby power. [840](70)

ENTER 4464 ON CARD

AME System have released a range of workstation designed for use in the electronics industry. The **Ergostyle** and **Ergoman** have full ESD protection by way of a dissipative or conductive working surface. [790](10603)

ENTER 4465 ON CARD

DMM and counter in VXI module

Tektronix has released the VX4101 DMM/counter. It combines a full function 5.5 digit digital multimeter with a two-channel 250MHz universal counter in a single slot C-size form factor. It also includes integrated switching and scanning control.

The VX4101 uses the VXI*plug&play* platform and is compatible with Win Framework 4.0. It provides a variety of key measurements, including ac/dc volts, 2- and 4-wire ohms and dc current. The counter function has frequency, period, time interval, pulse width and other measurements.

The DMM can measure 5.5 digits at 50 readings/s and 4.5 digits at 1000 readings/s. The counter function allows higher frequencies (an optional 500MHz on both channels) and finer resolution (250ps single shot, 1ps averaged). [1270](95)

ENTER 4466 ON CARD

Design tools

A new series of Intusoft analogue and mixed signal design tools is available from ME Technologies. The packages, ICAP for OrCAD, ICAP for Protel and ICAP for Viewlogic, use OLE technology to transparently integrate analogue and mixed signal capability into the schematic tools.

Each package includes the IsSpice4 native mixed mode circuit simulator, SPICE model libraries with over 8000 analogue and digital parts, the IntuScope graphical waveform analyser, the SpiceMod SPICE modelling program, a set of symbol libraries, and the Intusoft integration module. The latter allows engineers to run SPICE simulations directly from their OrCAD, Protel or Viewlogic schematics and cross-probe the results in real time.

Features like SPICE Part Browsing and Model Editing, custom SPICE attribute dialogues for each element, special dialogues for SPICE analysis statements, waveform cross-probing from both the schematic and layout, and the ability to launch and control the simulator from the schematic. [384](11128)

ENTER 4467 ON CARD

Programmer and tester

Nucleus Computer Services has available the Power-100 universal programmer and tester from Sunshine. It comes with a built-in power supply and printer port connection.

It is suitable for development and volume production. Features include: 48 pin Textool as standard, a full range of adaptors to cover a wide range of packages, up to 8 gang programming for production use, rapid programming — 27C256 in 6 seconds, and it supports over 1500 devices.

It can test and identify TTL & CMOS logic, SRAM, DRAM, SIMM/SIP and logic vector test. Special care has been taken to eliminate ground bounce and overshoot. Each of the 48 pins has an active pull-up feature to give less than 10ns rise time and adjustable waveform slew rate. [388](2093)

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Handheld oscilloscope/multimeter

Tektronix has released the THS730A, a handheld oscilloscope/digital multimeter. It operates at 200MHz with a 1GS/s digital real time sampling rate.

The THS730A was developed for design and test engineers responsible for electronic circuit design and debug, as well as field troubleshooting. It offers high speed dual channel/ dual digitiser measurement and triggering capabilities for quick timing error detection and it uses the TekScope graphical user interface.

Other features of the scope include comprehensive and advanced triggering, glitch capture, and dB and dBm measurements. Its battery charge time is only nine hours and it comes with two 200MHz P6117 probes.

Other members of the THS700 family include the THS710A, THS720A and THS720P. The latter is designed for electrical service and power electronics professionals and offers up to 1000Vrms measurement capability. [1270](95)

ENTER 4469 ON CARD

Optically isolated digital I/O card

Intelligent Systems Australia has released the PI-426, a 16-channel optically-isolated digital input and 8-channel relay output interface board for data acquisition and control using an IBM PC/XT/AT or compatible computer. It is suited to applications such as digital data input, counter closure monitoring, cry contact sensing and power ON/OFF control.

By setting onboard jumpers, there are two input modes available: dc voltage input or dry contact input. The board can accept 3-24Vdc input voltage or dry contacts can be detected by using external power source or internal 12Vdc. Each digital input port of eight channels may generate an interrupt request to the PC system whenever one of 16 D/I channels or inputs change.

The PI-426 also has eight electromechanical SPDT relays. Each relay had three contacts available: normally open, normally closed and common. Each relay is equipped with an LED for monitoring its ON/OFF status. [394](19267)

ENTER 4470 ON CARD

Magic design software

Veltek Australia has released Analog Magic 2.0 design software from IMP. It runs on Windows based personal computers and allows users to configure and program working EPAC silicon using a simple point-and-click approach. EPAC devices are the analogue counterpart to digital field programmable gate arrays (FPGAs).

Release 2.0 supports the new IMP50E30 programmable monitoring and diagnostic chip. The chip's window and level comparison modes, channel sequencing modes and analogue-to-digital converter mode can be set up and configuration data stored in on-chip EEPROM memory with the Analogue Magic software and IMP hardware development tools.

To simplify the circuit documentation process, the on-screen circuit image can now be pasted into the Windows clipboard for placement into other Windows compatible documents. A print preview function has also been added. [384](3946)

ENTER 4471 ON CARD

DESIGN TIP #39

Limited supply NiCd charger

DC/DC converters can provide the basis of a simple and efficient constant current charger for nickel-cadmium (NiCd) batteries, but care must be taken when using converters in a design where supply power is limited.

DC/DC converters make very efficient constant current sources for charging NiCd batteries. Unfortunately, the input of a switcher exhibits a negative impedance characteristic, and this can cause problems in systems where the source is power or current limited. Various schemes are used to preclude input foldback. Undervoltage lockout works well with power limited sources, keeping the converter off until the input voltage has risen to the point where it can develop adequate power.

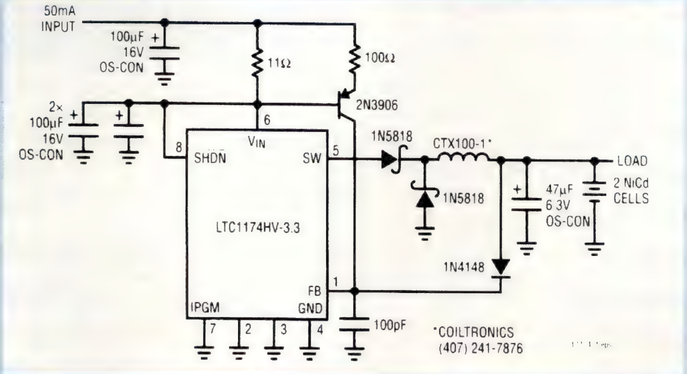

Figure 1. Schematic diagram of a constant-current battery charger for use when supply power is limited.

Undervoltage lockout does not work with current limited sources however. A better approach is to control the converter's input current to match the current available from the source. The circuit shown in *Figure 1* does just that, while charging two NiCd cells.

Input current is sensed by a PNP transistor and applied as feedback to an Linear Technology LTC1174 step-down converter. The converter draws just enough power to hold the input current at 50mA, matching the abilities of the wall adaptor.

Output current into two cells is nominally 180mA, but climbs to over 300mA when the batteries are completely discharged. Efficiency is about 78% at 3V output. If the batteries are removed from the charging circuit, the output voltage climb to levels destructive to the load. To prevent this, a second feedback path is applied to Pin 1 via a diode, limiting the output voltage to approximately 3.7V.

Another condition that can spell trouble for some simple circuits such as this one is the loss of input power while the batteries are still connected to the circuit. An extra Schottky diode placed in series with the switch (Pin 5) blocks reverse current flow into the converter and prevents damage. The output can also be short circuited without damage to the device. Shutdown (Pin 8) allows logic control over the charger so the charging current can be interrupted without disconnecting the source supply. ❐

This article was supplied by Advanced Component Distributors, representatives of Linear Technology Corporation in Australia.

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DESIGN TIP #40

Forget me not

This simple circuit idea provides efficient power with very low quiescent current draw for the backup of volatile memory.

The high-efficiency RAM-backup power supply shown in *Figure 1* delivers 5V at 1mA for inputs in the range 8V to 32V. Most single-chip regulators that operate over this range are bipolar ICs with quiescent currents comparable to the 1mA load current. This circuit, however, draws only 10µA when operating.

The JFET series pass element operates as a switched current source in a switched linear regulator: at startup, C1 is fully discharged and Q1 acts as a current source. V_{out} rises linearly as C1 charges, activating IC1 at 2V and continuing toward the 5V threshold set by R3 and R4. IC1 combines a CMOS micropower comparator and 1.182V band gap reference. As V_{out} reaches its threshold, the comparator output goes low, turning off Q1 by reverse-biasing its gate source junction. As the load current discharges C1 below the output threshold, Q1 turns back on and completes one switching cycle.

Q1's depletion characteristic ensures start-up for the circuit. It also ensures excellent PSRR (more than 60dB for V_{in} between 5.5V and 30V), because both the reference and the error amplifier receive power from the regulated output voltage. Q1 should be chosen for I_{DSS}, $V_{GS(OFF)}$, and V_{DS}. I_{DSS} is the current drawn at start-up, when Q1 is saturated (ie. when V_{GS} is zero and V_{DS} is less than or equal to $V_{GS(OFF)}$). $V_{GS(OFF)}$, which determines the minimum allowed V^{in} — V^{out} difference for proper circuit operation, must be less than V^{out} to ensure that Q1 can turn off. The Q1 device shown in the prototype circuit (J109) specifies a minimum I^{DSS} of 40mA, a $V^{GS(OFF)}$ between -6V and -2V, and a minimum V^{DS} of 25V. For production, a J113 type is more appropriate.

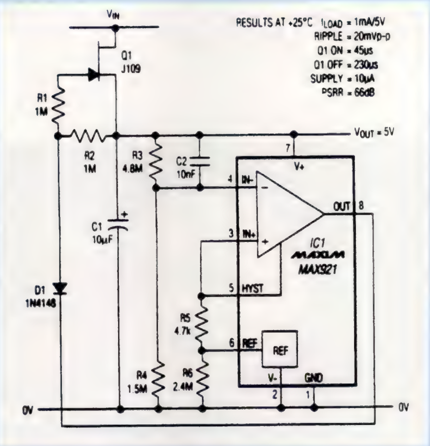

Figure 1. This simple RAM backup supply offers efficiency and versatility.

C2 reduces output ripple by speeding the propagation of feedback to the comparator's inverting input. Without C2, the high value of R3 (necessary to minimise the circuit's quiescent current) combines with parasitic capacitance to slow the regulator's response. The value shown (10nF) lowers the sawtooth-ripple voltage from $200mV^{p-p}$ to $20mV^{p-p}$. Larger C1 values further decrease the ripple while increasing the circuit's off time, which also reduces the average supply current. R1 and R2 determine the on-time. R1 also limits the turn-off spikes produced by rapid high-to-low transitions on the gate of Q1.

IC1's pin 5 (HYST) lets the user add comparator hysteresis, adjustable via R5 and R6. The R6 value shown (2.4MΩ) makes the hysteresis value in mV (about 5mV in this case) numerically equal to the R5 value in kΩ. ❐

This article was supplied by Veltek, which represents Maxim Integrated Products in Australia.

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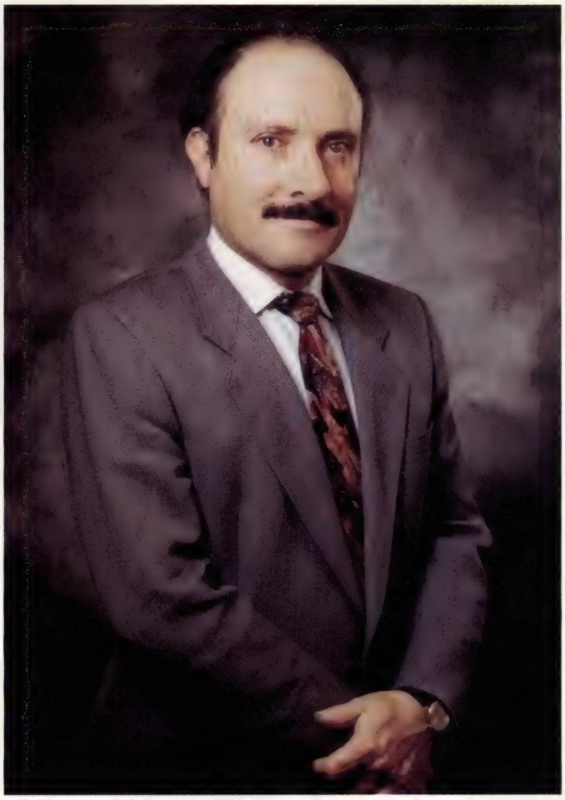
Silicon visions

A conversation with Xicor's Raphael Klein

Raphael Klein is president and chairman of the board of directors of US semiconductor memory company Xicor. *AEE*'s editor *Rob Irwin* caught up with him on a recent Australian visit to chat about the future of the silicon world as we know it.



Xicor is a Californian-based company in the business of making memories. Not the type commonly sung about in love songs, but the silicon variety. Raphael Klein is the charismatic reigning president of the company and he visited Australia earlier this year to consult with customers here on ideas for enhancing his company's products.

Xicor's strategy has been to take its non-volatile, reprogrammable core and add features and systems to the chip with the aim of minimising the low-end design work that has to be done by engineers, freeing them up to develop higher-level systems and software.

AEE: *Xicor is a fairly large company selling products all over the world. How does the company view the Australian market?*
RK: On a proportional basis it's a good market. Obviously it's a small percentage of total sales, but I would say per capita and by some other measures it's definitely not the weakest one.

It's a pleasure being here. I was impressed with the technical competence of the customers I've visited. We discussed some new ideas for products, and we got some excellent input.

AEE: *What sort of new products have you been talking about?*
RK: We used to be just a memory company. We are now using the non-volatile reprogrammable memory core as an enabling embedded element. Using that core, we are building products that look like non-memory products. Obviously memory is still the major portion of the business. These additional products are still memory, but with added functions that previously would have been implemented with analogue or glue logic chips. We are adding more and more logic to the chips, so they are becoming more mixed-mode devices with more functionality on board.

AEE: *Is that a customer-driven trend?*
RK: In general all systems today can use field reprogrammable, non-volatile elements, either for program storage, data storage, calibration storage, identification storage or for trimming parameter storage.

What we see today is that software dominates systems and hardware is taken for granted. Also, the pace of electronic development has accelerated to essentially twice a year. Everything is governed by the two big consumer electronics shows, which alternate every half a year. If you don't show your product at these shows you are essentially out of the market. By the time the next show comes up, the product will be obsolete.

So you have to say 'the software is good enough so we go out'. But then you want a means to quickly update the software in the field. That need is a big driving force in the non-volatile, reprogrammable memory market.

Also, the software people can use as much memory as you give them. They are never satisfied with the space available. From a project manager's standpoint, silicon is cheap and at the level where it is not the main cost driver, so he'd rather have inefficient software, but run fast. So you throw more memory at the software and tell the engineer to finish the job. You don't need to beautify or compress the code, you just want the job finished. That's also a big driver for non-volatile memory.

AEE: *Do you think these time-to-market pressures are leading to less well developed products — basically sloppy engineering?*
RK: I think this is a trend in humanity in general. We are now well into the information age, and I think a good comparison is to look at politics. It used to be that the politicians 50 years ago had limited means of communication. Mostly it was through writing in newspapers. They had to be pretty precise then, because once the words were committed to paper they stayed there forever. Today everything is via television. The politician says something and the spin doctors come and adjust it — sloppiness, right?. Who am I to make a judgement on whether this is good or bad — this is life. If it's real-time, like radio and TV, you cannot expect precision.

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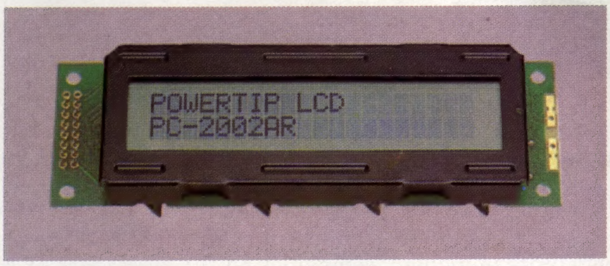

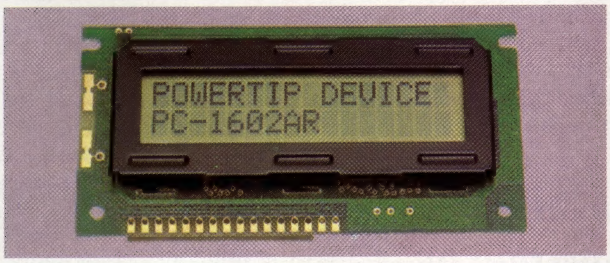

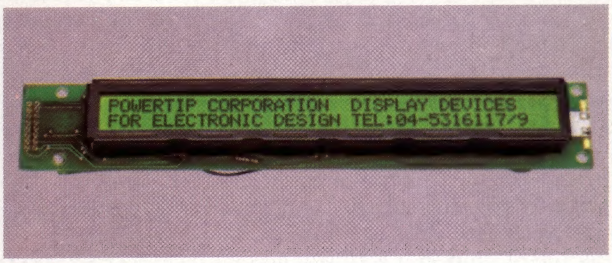
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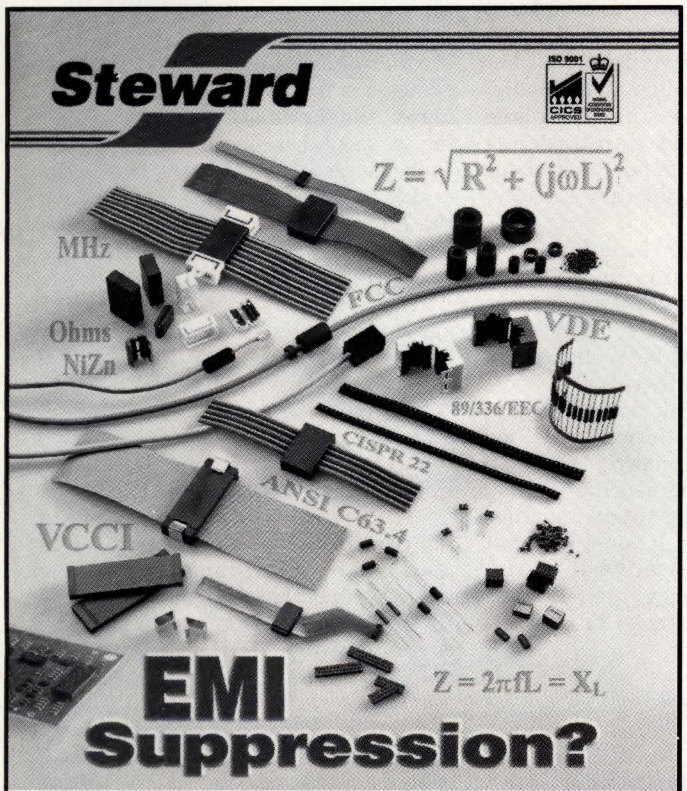

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When you have time-to-market pressures you cannot ask engineers to be so precise. They work enough hours already. OK, it is sloppy, but in the old days it was hard to correct an error once the product had gone out. Today you just change the software — you download a new version.

There is another interesting equivalent if you look at mechanical systems. Automobiles suffer wear and tear. In the old days a mechanic used to listen to the engine, tap on it, adjust a few things. These days you have microprocessor control which dynamically adjusts the engine. You get better mileage and less pollution as result, and in a way you accept wear-and-tear and sloppy mechanical performance because you compensate with electronics.

AEE: *Are we close yet to reaching any limits on silicon-based technology?*
RK: I think that silicon-based technology has a long way to go. Today in production the industry is still in the process of moving into 0.6 micron, and many products are still shipped using 0.8 or 1.2 micron geometries. Just a few companies, the most advanced, are in production at 0.5 micron, and just a handful are getting to 0.35 micron. From the physics of the semiconductor industry there is no limitation on going a few more generations — 0.35, 0.25, 0.18, 0.12, 0.07 micron. So I don't see the industry hitting any significant limits for 30 or 40 years at least.

If you are religious you might say that there is something beyond the comprehension of mere mortals operating here. If you look at the system we use, silicon is the most abundant element. The second most abundant element is oxygen, and silicon dioxide makes an excellent compatible material to silicon. You sprinkle on a little bit of phosphorus, which stabilises everything, then you interconnect everything with aluminium, which is the third most abundant element. So it's almost a miraculous thing that we have this combination. The raw materials are very inexpensive and abundant, as if somebody gave it to us to do something with.

So I don't see that we are reaching any end to the evolution of silicon systems, at least not in our lifetime.

AEE: *What are the major trends driving semiconductor development at the moment?*
RK: Customers in general want a higher level of integration. In addition, because today's personalised electronics are focused on space, power and battery life, designers want to implement the circuit using fewer components. They want those components to use less power and run off lower voltages, and they want much more sophisticated electronics.

In a way it's similar to the early days of the PC. After the introduction of giant PC boards with dozens of glue chips, the industry evolved chipsets. From Xicor's point of view, since the reprogrammable memory core is an integral part of today's systems, we see no reason not to absorb additional logic or analogue functions into the memory chip. We are doing this more and more and we find the customers appreciate it. In effect we are doing integration for them.

> ***"You can see today in the information age that the countries which don't have a strong domestic electronics industry are lacking in vibrancy."***

AEE: *Are we headed towards the realm of generic hardware?*
RK: In the long run yes. In a sense we have generic hardware today in the magnetic area. Disk drives, for example are all compatible. You have two standards — SCSI and IDE. It doesn't really matter who you buy a drive from, its compatible. Silicon is a much more sophisticated creature, so we still have a long way to go as far as standardisation is concerned. But there is now talk about standardisation of what they call system-on-chip.

It's an interesting thing however, because embedded in this concept is the idea that all the intellectual property — particularly with the silicon guys that do gate arrays — will be opened up to the customers. I think there will be some objections to that. If you look at the gate array manufacturers, the only way they can retain their silicon property is through the non-recurring engineering — they get paid for combining things together so they're easy to use. If you allow that to become standardised, what do you have left to make money from? But the customers are pushing to have standardised electronics.

AEE: *What regions represent the fastest growing markets for electronics at the moment?*
RK: Asia is in general probably the fastest growing area for the whole of the semiconductor industry. You see new wealth in the Pacific Rim definitely, and interestingly enough California is part of that. California is essentially a Pacific 'country'. It's almost not part of America from the electronics standpoint. If you look at it, a lot of the manufacturing in the semiconductor industry is done in the far east. The testing and assembly is not done on American soil. If you look at the semiconductor companies and the system companies on the west coast of America, they are clearly part of the Asian manufacturing world.

The wealth of the Asian countries is increasing. These people need electronics either as a necessity or as a status symbol. The necessity comes from the fact that there is little in the way of telecommunications infrastructure. No wires have been strung, so to them going wireless is natural.

Most of humanity is housed around the Pacific Rim, so this need for communications infrastructure is really driving the semiconductor market. Then of course the PC is also exploding in Asia. Europe and America are OK, but Asia is far more vibrant.

AEE: *Can Australia play a significant role in this Asian electronics explosion?*
RK: Firstly, let's look at the fact that California and Australia are both Pacific countries. It's up to us to show we are willing to participate. The Australian government should be encouraged to invest in the electronics departments in all the engineering schools in order to produce more electronics engineers. That's the fuel of the industry. If you don't have enough graduates you don't generate new ideas. And it's almost impossible now to import people because they are in demand everywhere.

It's interesting, you can see today in the information age that the countries which don't have a strong domestic electronics industry are lacking in vibrancy.

Everyone is entering this information age around the same time so there is a thirst for electronics everywhere. I would say the threat from Asia to the 'old' world is only effective in countries which are not willing to fight. But if they are willing to fight, there is enough consumption to keep themselves busy.

At the same time, unlike the auto industry or the aircraft industry, you can start with minimal capital. A few engineers get together with some ideas and they can start a company to make say communications devices. They buy the chips; they don't have to make them. Somebody will assemble the PC board. So all they need are the ideas, the ability to write software quickly and the concept of marketing. The funding initially could be very minimal. There is a lot of 'cottage industry' potential if you have the guts to do it.

There's no reason Australia can't do it. The spirit is there and nobody has a proprietary holding on success in this industry any more. ❐

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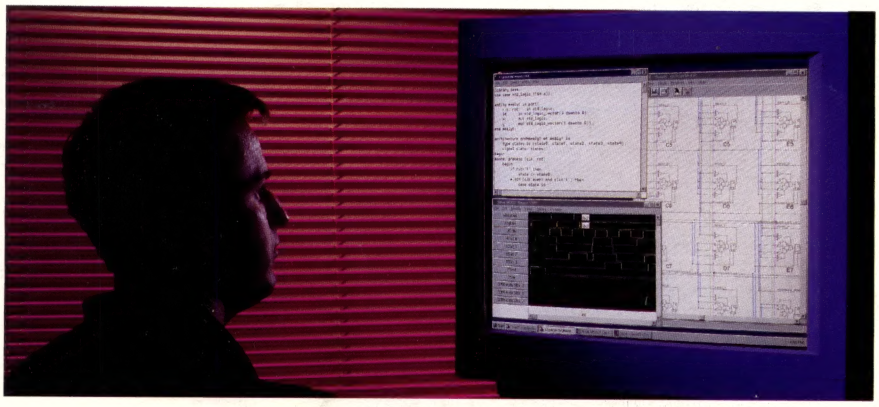

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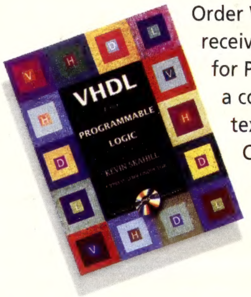

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